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FEASIBILITY STUDY OF REMEDIAL ALTERNATIVES FOR THE ESTUARY AND LOWER HARBOR/BAY

NEW BEDFORD HARBOR
MASSACHUSETTS

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NOTICE

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ESTUARY AND LOWER HARBOR/BAY FEASIBILITY STUDY
NEW BEDFORD HARBOR, MASSACHUSETTS

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EXECUTIVE SUMMARY

A range of remedial action alternatives was developed for the New Bedford Harbor Superfund site to address potential threats to human health and the environment due to polychlorinated biphenyls (PCB)-contaminated sediments present in the Acushnet River estuary and New Bedford Harbor.

New Bedford, Massachusetts, home port of one of the largest commercial fishing fleets in the U.S., is located approximately 55 miles south of Boston on Buzzards Bay. In 1979, New Bedford Harbor and upper Buzzards Bay were closed to fishing due to PCB contamination and PCB accumulation in marine biota. The New Bedford Harbor site was added to the U.S. Environmental Protection Agency (EPA) Superfund National Priorities List in 1982.

The PCB contamination was introduced into the estuary and harbor primarily as a result of the discharge of process wastewaters from electronics component manufacturing companies in New Bedford. The most heavily contaminated sediments are located in the top 12 inches, where PCB concentrations exceed 4,000 parts per million (ppm) in certain areas (i.e., hot spots) of the estuary. At a depth of 24 to 36 inches, most of the estuary sediments are below 10 ppm, except for the isolated areas. In the lower harbor/bay area, contamination is more widely distributed but in lower concentrations than in the estuary, ranging from non-detect to 100 ppm, with more contaminated areas coinciding with combined sewer outfalls. Numerous field studies and numerical transport modeling indicate that PCB contamination in New Bedford Harbor can be attributed to transport and deposition from the more highly contaminated sediment in the estuary.

Sediments in the estuary and harbor are also contaminated with heavy metals (i.e., cadmium, copper, lead, and chromium) from past industrial plating and textile dyeing discharges. These metals, like the PCB contamination, are also present in the greatest concentrations in the top foot of sediment, decreasing with depth. Total metals concentrations (i.e., cadmium, copper, lead, and chromium) throughout the estuary and harbor range from non-detect to greater than 5,000 ppm. High concentrations coincide with the location of industrial or combined sewer outfall discharge pipes. Metals concentrations decrease with distance from the upper harbor to the outer bay.

Following identification of PCBs in New Bedford Harbor and the Acushnet River Estuary, numerous field sampling programs were conducted; these data were compiled by EPA. Under contract to EPA, a Feasibility Study (FS) was conducted by NUS Corporation (NUS) in 1984 to address contamination in the upper estuary. In response to comments and concerns raised as a result of this FS, EPA resolved to conduct further studies to better characterize the site and answer the comments and concerns. These studies included an engineering feasibility study of dredging and dredged material disposal alternatives and a pilot study of dredging and disposal by the U.S. Army Corps of Engineers; wetland assessments by Sanford Ecological Services, Inc., and IEP, Inc.; and a sediment transport and food chain model by Battelle Pacific Northwest Laboratories and HydroQual, Inc., respectively. In 1986, Ebasco Services, Inc., was contracted to prepare an FS under the EPA REM III Program that would incorporate the studies with the work conducted by NUS, and provide EPA with a range of alternatives to remediate PCB and metals contamination in New Bedford Harbor.

In 1989, a 5-acre area, known as the Hot Spot and containing 45 percent of the total PCB mass in New Bedford Harbor, was designated as an operable unit by EPA Region I. This approach enabled EPA to proceed with a response action on a discrete, well-defined area of the site before selecting an overall remedial action. An FS of remedial alternatives for the Hot Spot was completed in July 1989, and a Record of Decision for the operable unit was signed in April 1990.

This document presents a range of overall remedial actions to address potential threats to human health and the environment caused by PCB and heavy metals contamination in the sediments and water column of the estuary (excluding the Hot Spot) and the lower harbor/bay. These actions were developed in response to the remedial action objectives, which consider the contaminants and media of interest, exposure pathways, and preliminary remediation goals.

Human health and ecological risk assessments were developed to determine the risks associated with contaminant exposure in the estuary and the lower harbor/bay. Human health risks in excess of the state requirements and EPA guidance were associated with direct contact and incidental ingestion of sediments and ingestion of biota. These risks were attributed primarily to PCB exposure; however, concentrations of lead in shoreline sediments and biota were associated with elevated noncarcinogenic risks. Aquatic organisms in New Bedford Harbor were considered at significant risk primarily due to exposure to PCBs. Some risk was associated with exposure to metals; however, it was considered negligible compared to the risks due to PCBs.

A Target Clean-up Level (TCL) of 10 ppm PCB in sediment was developed as the remedial action objective for the estuary and the lower harbor/bay. This residual PCB concentration provides an adequate level of protection to human health against direct contact exposure and incidental ingestion of sediment contaminated with PCBs. In addition, the 10 ppm TCL will result in a reduction of PCB concentrations in biota. Some residual risk to marine biota is predicted. However, the severe ecological impacts associated with remediation of the estuary to lower sediment TCLs are considered to outweigh the benefits obtained from reduced contamination in the study area. Therefore, a 10 ppm PCB TCL is considered a practicable level to attain.

The estuary and lower harbor/bay FS was conducted in accordance with the following legislation and guidance governing hazardous waste remediation:

- National Oil and Hazardous Substances Pollution Contingency Plan; Final Rule (FR 47912, November 1985)

- Superfund Amendments and Reauthorization Act (SARA) of 1986

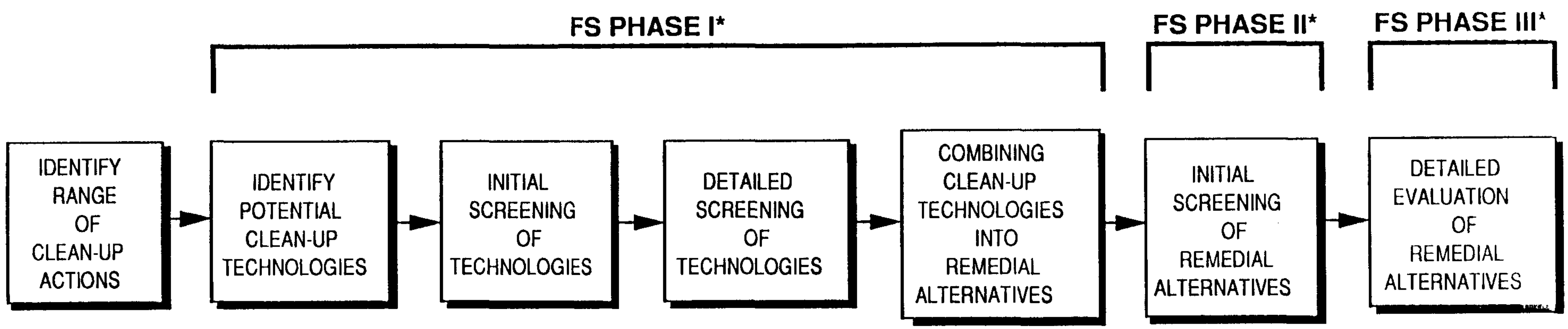
- Guidance for Conducting Remedial Investigations and Feasibility Studies under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); Interim Final (EPA Office of Solid Waste Emergency Response [Oswer] Directive 9355.3-01; October 1988)

- National Oil and Hazardous Substances Pollution Contingency Plan; Final Rule (FR 8666, March 1990)

The remedial alternative selected for the estuary and lower harbor/bay will be consistent with the remedial strategy selected for the Hot Spot Area. The combination of the two would achieve the established Target Clean-up Levels (TCLs) for the overall New Bedford Harbor site. Figure ES-1 is an overview of the FS process for the New Bedford Harbor Superfund site.

Remedial technologies were identified for the New Bedford Harbor site consistent with the remedial action objectives, and screened according to waste- and site-limiting characteristics. Bench- and pilot-scale studies were conducted on the treatment technologies retained, as well as a pilot-scale study on dredging and disposal technologies. The technologies and processes retained for developing remedial alternatives are shown in Figure ES-2.

A range of alternatives was developed for the estuary (EST) and the lower harbor/bay (LHB) including no-action, containment, and removal with or without treatment prior to on-site disposal. These alternatives were screened on the basis of effectiveness, implementability, and cost. The following 12 alternatives were retained for detailed analysis:



* EPA OSWER DIRECTIVE OCTOBER, 1988: GUIDANCE FOR CONDUCTING REMEDIAL INVESTIGATION AND FEASIBILITY STUDIES UNDER CERCLA

FIGURE ES-1
OVERVIEW OF THE FS PROCESS
ESTUARY AND LOWER HARBOR AND BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR

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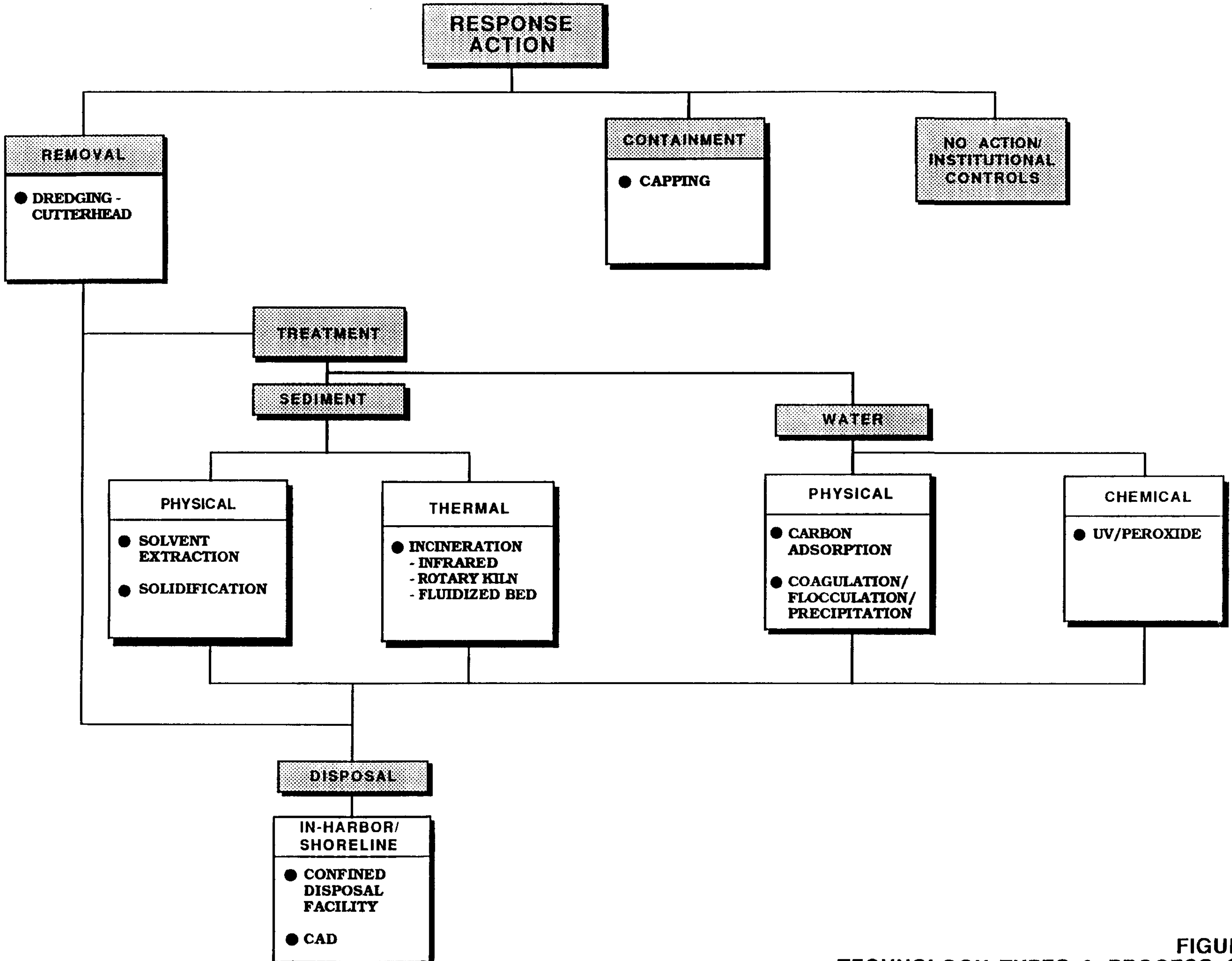

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FIGURE ES-2
TECHNOLOGY TYPES & PROCESS OPTIONS
RETAINED FOR REMEDIAL ALTERNATIVES DEVELOPMENT
ESTUARY AND LOWER HARBOR AND BAY FEASIBILITY STUDY
NEW BEDFORD HARBOR

ALTERNATIVE NUMBER	ALTERNATIVE DESCRIPTION
EST-1	Minimal No action
EST-2	Capping
EST-3	Dredge/Dispose of On-site
EST-4	Dredge/Dewater/Solidify/Dispose of On-site
EST-5	Dredge/Dewater/Solvent Extract/ Dispose of On-site
EST-6	Dredge/Dewater/Incinerate/Solidify Ash/Dispose of On-site

ALTERNATIVE NUMBER	ALTERNATIVE DESCRIPTION
LHB-1	Minimal No-action
LHB-2	Selective Capping
LHB-3	Dredge/Dispose of On-site
LHB-4	Dredge/Dewater/Solidify/Dispose of On-site
LHB-5	Dredge/Dewater/Solvent Extract/ Dispose of On-site
LHB-6	Dredge/Dewater/Incinerate/Dispose of On-site

These alternatives were evaluated in greater detail according to the following nine NCP evaluation criteria:

- short-term effectiveness
- long-term effectiveness
- reduction in mobility, toxicity, or volume
- implementability
- cost
- compliance with ARARs
- overall protection of public health and the environment
- state acceptance
- community acceptance

The first seven criteria were also used to evaluate the alternatives relative to one another in the comparative analysis of alternatives. Table ES-1 summarizes results of the detailed analysis. Comparative costs of the remedial alternatives for the estuary and lower harbor/bay are shown in Figures ES-3 and ES-4, respectively.

TABLE ES-1
COMPARATIVE ANALYSIS SUMMARY TABLE

ESTUARY AND LOWER HARBOR/BAY
FEASIBILITY STUDY

ASSESSMENT FACTORS	ALTERNATIVES EST-1 & LHB-1 MINIMAL NO-ACTION	ALTERNATIVES EST-2 & LHB-2 CAPPING	ALTERNATIVES EST-3 & LHB-3 DISPOSAL	ALTERNATIVES EST-4 & LHB-4 SOLIDIFICATION/DISPOSAL
Reduction of Toxicity, Mobility, or Volume	No reduction in toxicity, mobility, or volume because no remedial action is employed.	No reduction in mobility or toxicity. May cause an increase in volume of contaminated sediment.	No reduction in mobility or toxicity. Volume would increase if the sediment is not dewatered prior to disposal.	Reduction in mobility of the contaminants. No reduction in toxicity. Volume increased by solidification.
Short-term Effectiveness				
o Time until Protection is Achieved	No reduction in human health or environmental risk is expected.	Reduction in human health risk should occur immediately after cap placement and consolidation. Time required to achieve protection of biota depends on benthic recoloni zation of new cap surface.	Reduction in human health risk should occur immediately after sediment removal. Significant reduction in water column concentrations and subsequent reduction biota.	Same as Alternatives EST-3 and LHB-3.
o Protection of Community during Remedial Actions	No impact to community during remedial action.	No impact to community during remedial action.	Dredge controls and air quality controls will minimize community impacts.	Same as Alternatives EST-3 and LHB-3.
o Protection of Workers during Remedial Actions	Minimal risk to workers during fence/sign installation.	Minimal risk to workers during cap placement.	Protection required against dermal contact with dredged sediments.	Protection required against dermal contact with dredged sediments and fugitive dust from dewatered sediments and solidification process.
o Environmental Impacts	No significant adverse environmental impact from fence installation.	Destruction of benthic community will occur. Sediment resuspension expected during cap construction.	Minimal environmental impact expected from dredging or construction.	Same as Alternatives EST-3 and LHB-3.
Long-term Effectiveness				
o Magnitude of Residual Risk	Significant human risks remain for human health associated with direct contact of surface soils. Environmental risks would continue unmitigated.	Potential risks remain because contaminated sediments remain in place.	Slight risks remain because the contaminants are not treated.	After sediments have been solidified and disposed of on-site, there will be minimal residual risk.
o Adequacy of Controls	No direct engineering controls; fence subject to vandalism; annual monitoring and repair required.	Annual monitoring and maintenance is required. Channel maintenance and shoreline construction would be limited. Controls to limit access to the estuary may be difficult to enforce.	Confined disposal facility construction is a proven technology; annual monitoring and maintenance is required.	Solidification and confined disposal facility construction are proven technologies, annual monitoring and maintenance of the CDFs is required.

TABLE ES-1
(continued)
COMPARATIVE ANALYSIS SUMMARY TABLE

ESTUARY AND LOWER HARBOR/BAY
FEASIBILITY STUDY

ASSESSMENT FACTORS	ALTERNATIVES EST-5 & LHB-5 SOLVENT EXTRACTION	ALTERNATIVES EST-6 & LHB-6 INCINERATION
Reduction of Toxicity, Mobility, or Volume	Reduction in toxicity and mobility of PCB sediments. Volume also decrease since the aqueous and organic fractions will be removed.	Reduction in toxicity and mobility of PCB sediments. Volume also reduced since the aqueous and organic fractions will be removed.
Short-term Effectiveness		
o Time until Protection is Achieved	Same as Alternatives EST-3 and LHB-3.	Same as Alternatives EST-3 and LHB-3.
o Protection of Community during Remedial Actions	Same as Alternatives EST-3 and LHB-3.	Same as Alternatives EST-3 and LHB-3.
o Protection of Workers during Remedial Actions	Protection required against dermal contact with dredged sediments and fugitive dust from dewatered and treated sediments.	Protection required against dermal contact with dredged sediments and fugitive dust from dewatered sediments and ash.
o Environmental Impacts	Same as Alternatives EST-3 and LHB-3.	Same as Alternatives EST-3 and LHB-3.
Long-term Effectiveness		
o Magnitude of Residual Risk	After sediments have been treated and solidified (if needed), there will be minimal residual risk.	After sediments have been incinerated and the ash solidified (if needed), there will be minimal risk associated with the treated sediments.
o Adequacy of Controls	Treatment by solvent extraction is expected to produce a treated residue that will not need long-term control.	Incineration is a proven technology; no long-term management of treatment residuals required.

TABLE ES-1
(continued)
COMPARATIVE ANALYSIS SUMMARY TABLE

ESTUARY AND LOWER HARBOR/BAY
FEASIBILITY STUDY

ASSESSMENT FACTORS	ALTERNATIVES EST-1 & LHB-1 MINIMAL NO-ACTION	ALTERNATIVES EST-2 & LHB-2 CAPPING	ALTERNATIVES EST-3 & LHB-3 DISPOSAL	ALTERNATIVES EST-4 & LHB-4 SOLIDIFICATION/DISPOSAL
o Reliability of Controls	Sole reliance on fence and institutional controls to prevent exposure; high level of residual risk.	Reliability concerns due to potential for cap failure or disturbance.	Likelihood of CDF failure is minimized as long as O&M is performed. Leachate monitoring is required.	Likelihood of CDF failure is minimized as long as O&M is performed.
Implementation				
Technical Feasibility	Fence/signs are easily constructed; environmental monitoring well-proven.	Technology exists to effectively cap the estuary.	CDFs relatively easy to implement; dewatering proven during bench- and pilot-scale tests.	CDFs relatively easy to implement; dewatering and solidification of sediments proven during bench- and pilot-scale tests.
Administrative Feasibility	No off-site construction; therefore, no permits required.	Same as Alternatives EST-1 and LHB-1.	Same as Alternatives EST-1 and LHB-1.	Same as Alternatives EST-1 and LHB-1.
Availability of Services and Materials	Services and materials locally available.	Services and materials readily available. U.S.	Dredge, dewatering, and CDF construction services available in the eastern U.S.	Dredge, dewatering, and solidification services available in the eastern
Cost				
Present Worth Cost	$4,092,000/$3,386,000	$46,121,000/$59,792,000	$55,723,000/$47,675,000 $86,240,000/$77,811,000 (dewatered)	$170,740,000/$137,092,000
Compliance with ARARs	AWQC for water column PCB concentrations and FDA tolerance level for PCBs in biota would not be attained in all areas.	AWQC for water column PCB concentrations would not be attained in all areas for capping of estuary only (EST-2) but would be attained in all areas following capping of both estuary and lower harbor/bay. FDA tolerance level for PCBs in biota would not be attained in all areas.	AWQC for water column PCB concentrations would not be attained in all areas following cleanup of estuary only (EST-3) but would be attained in all areas following clean-up of estuary and lower harbor. FDA tolerance level for PCBs in biota would not be attained in all areas; waiver from action-specific ARAR may be required for unlined CDFs. All other ARARs would be met.	Same as Alternatives EST-3 and LHB-3.

TABLE ES-1
(continued)
COMPARATIVE ANALYSIS SUMMARY TABLE

ESTUARY AND LOWER HARBOR/BAY
FEASIBILITY STUDY

ASSESSMENT FACTORS	ALTERNATIVES EST-5 & LHB-5 SOLVENT EXTRACTION	ALTERNATIVES EST-6 & LHB-6 INCINERATION
o Reliability of Controls	Remedy would be highly reliable due to removal of sediment causing risk.	Same as Alternatives EST-5 and LHB-5.
Implementation		
Technical Feasibility	Solvent extraction would require special equipment and operators; treated residuals would require testing to verify treatment effectiveness; technology has been bench-tested on Hot Spot sediments.	Incineration would require special equipment and operators; treated residuals would require testing to verify treatment effectiveness; technology has been demonstrated at other sites.
Administrative Feasibility	Same as Alternatives EST-1 and LHB-1.	Same as Alternatives EST-1 and LHB-1.
Availability of Services and Materials	Solvent extraction equipment available from vendors but not readily. Equipment construction and pilot-scale tests may be required.	Dredge, dewatering, and mobile incinerator equipment and operators needed; services available in the eastern U.S.
Cost		
Present Worth Cost	$292,193,000/$237,391,000	$346,740,000/$280,196,000
Compliance with ARARs	Same as Alternatives EST-3 and LHB-3.	Same as Alternatives EST-3 and LHB-3.

TABLE ES-1
(continued)
COMPARATIVE ANALYSIS SUMMARY TABLE

ESTUARY AND LOWER HARBOR/BAY
FEASIBILITY STUDY

ASSESSMENT FACTORS	ALTERNATIVES EST-1 & LHB-1 MINIMAL NO-ACTION	ALTERNATIVES EST-2 & LHB-2 CAPPING	ALTERNATIVES EST-3 & LHB-3 DISPOSAL	ALTERNATIVES EST-4 & LHB-4 SOLIDIFICATION/DISPOSAL
Overall Protection of Human Health and the Environment				
o How Risks are Reduced, Eliminated, or Controlled	Risks to human health are reduced by restricting site access, environmental risks are not mitigated.	Risks to human health and the environment are reduced by minimizing contact with contaminated sediments.	Risks to human health and the environment are significantly reduced by the removal of the sediments.	Risks to human health and the environment are significantly reduced by the removal and treatment of the sediments.

TABLE ES-1
(continued)
COMPARATIVE ANALYSIS SUMMARY TABLE

ESTUARY AND LOWER HARBOR/BAY
FEASIBILITY STUDY

ASSESSMENT FACTORS	ALTERNATIVES EST-5 & LHB-5 SOLVENT EXTRACTION	ALTERNATIVES EST-6 & LHB-6 INCINERATION
Overall Protection of Human Health and the Environment		
o How Risks are Reduced, Eliminated, or Controlled	Same as Alternatives EST-4 and LHB-4.	Same as Alternatives EST-4 and LHB-4.

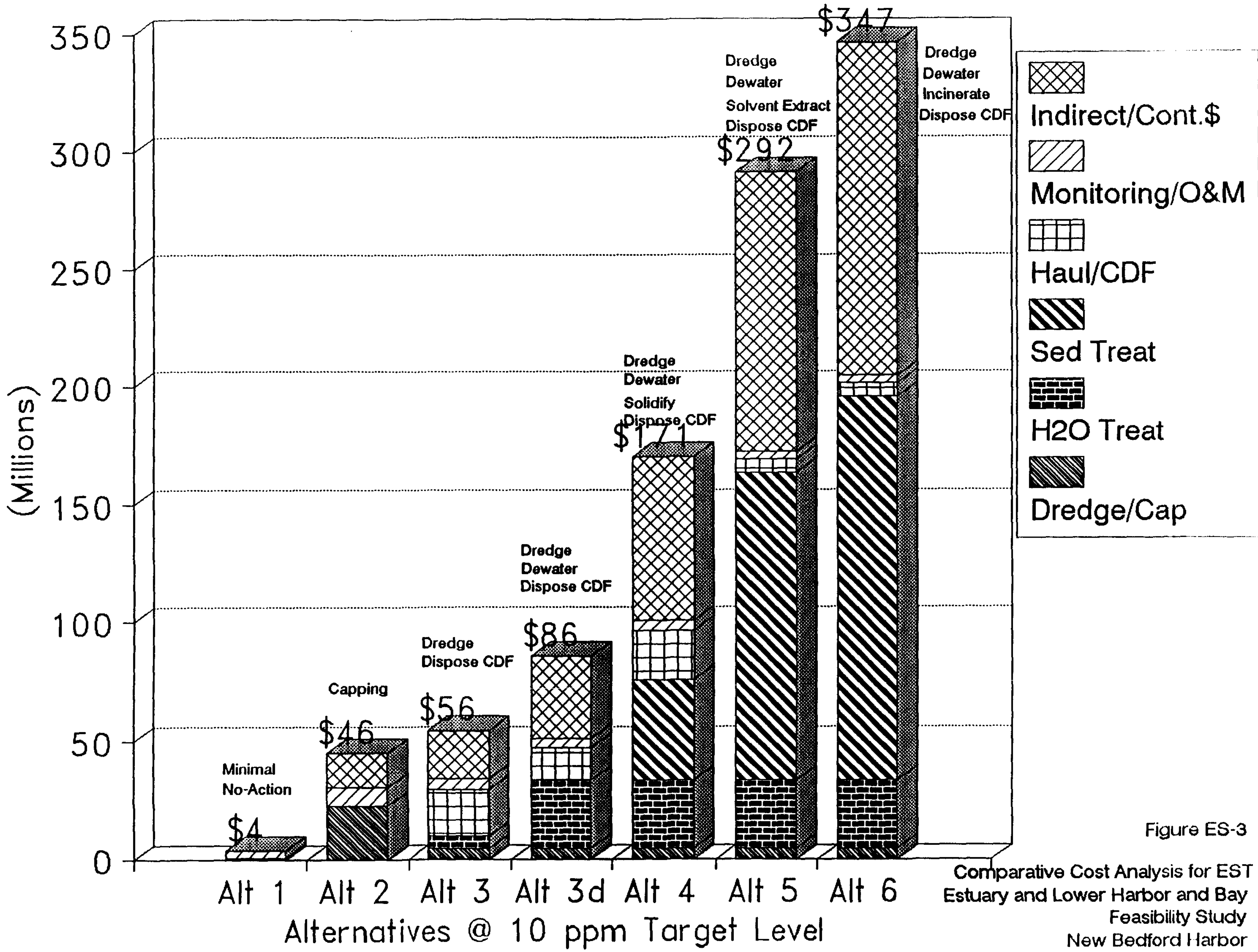

Figure ES-3

Comparative Cost Analysis for EST
Estuary and Lower Harbor and Bay
Feasibility Study
New Bedford Harbor

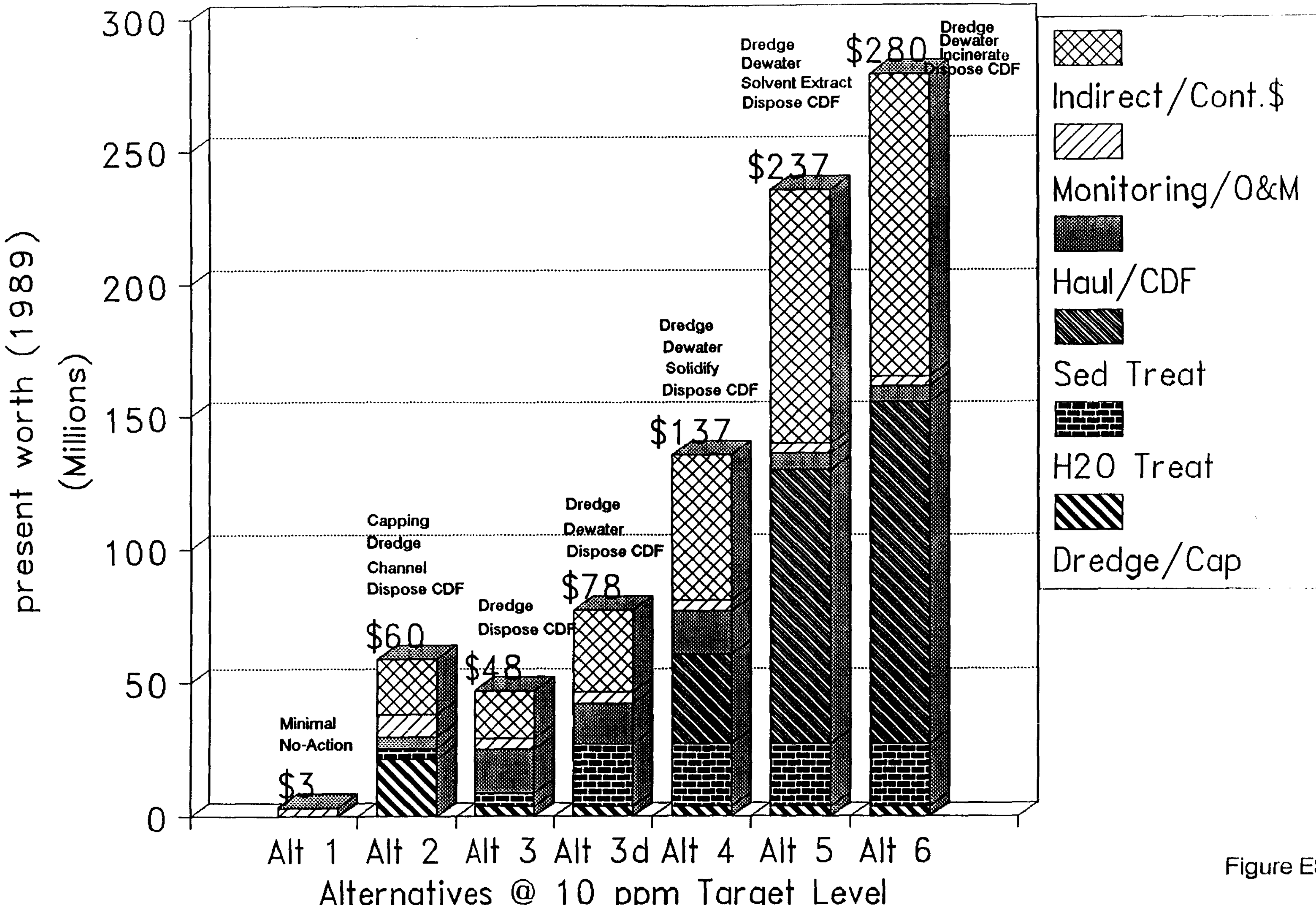

Figure ES-4

Comparative Cost Analysis for LHB Estuary and Lower Harbor and Bay
New Bedford Harbor
Feasibility Study

1.0 INTRODUCTION

This section provides a brief historical summary of the remedial studies conducted for New Bedford Harbor, a discussion of the operable unit approach used by the U.S. Environmental Protection Agency (EPA), and the organization of this report.

1.1 BACKGROUND

New Bedford, Massachusetts, is a port city located on Buzzards Bay, approximately 55 miles south of Boston (Figure 1-1). Historically, New Bedford is nationally known for its role in the development of the whaling industry in the early 1800s. Today, the harbor is home port to one of the largest commercial fishing fleets in the U.S.

In 1976, EPA conducted a New England-wide survey for polychlorinated biphenyls (PCBs) (EPA, 1976). During this survey, PCB contamination was detected in various locations throughout New Bedford Harbor. Further investigation identified two electrical capacitor manufacturers, Aerovox Corporation (Aerovox) and Cornell-Dubilier Electronics Corporation (Cornell-Dubilier), as major users of PCBs from the time operations commenced in the late 1940s until 1977, when EPA banned the use of PCBs. These industries discharged wastewaters containing PCBs directly into New Bedford Harbor and indirectly via the municipal wastewater treatment system (EPA, 1976).

Field studies conducted in the late 1970s and early 1980s showed PCB concentrations in marine sediment over a 985-acre area to range from a few parts per million (ppm) to over 100,000 ppm. Portions of western Buzzards Bay are also contaminated with sediment PCB concentrations in excess of 50 ppm. Water-column concentrations were found in excess of federal ambient water quality criteria (AWQC) (i.e., 30 parts per trillion, based on chronic impacts to marine organisms). Fish and shellfish PCB concentrations were found in excess of the U.S. Food and Drug Administration (FDA) tolerance limit (i.e., 2 ppm) for edible tissue. In addition to PCBs, heavy metals (notably cadmium, chromium, copper, and lead) were found in sediment in concentrations ranging from a few ppm to over 5,000 ppm.

As a result of the widespread PCB contamination and the accumulation of PCBs in marine biota, the Massachusetts Department of Public Health established three fishing closure areas in September 1979 (Figure 1-2). These closures are still in effect. Area I is closed to all fishing (i.e., finfish, shellfish, and lobsters). Area II is closed to the taking of lobsters and bottom-feeding finfish (i.e., eel, flounder, scup, and tautog). Area III is closed to lobstering only. Closure of the New Bedford Harbor and upper Buzzards Bay area to lobstering

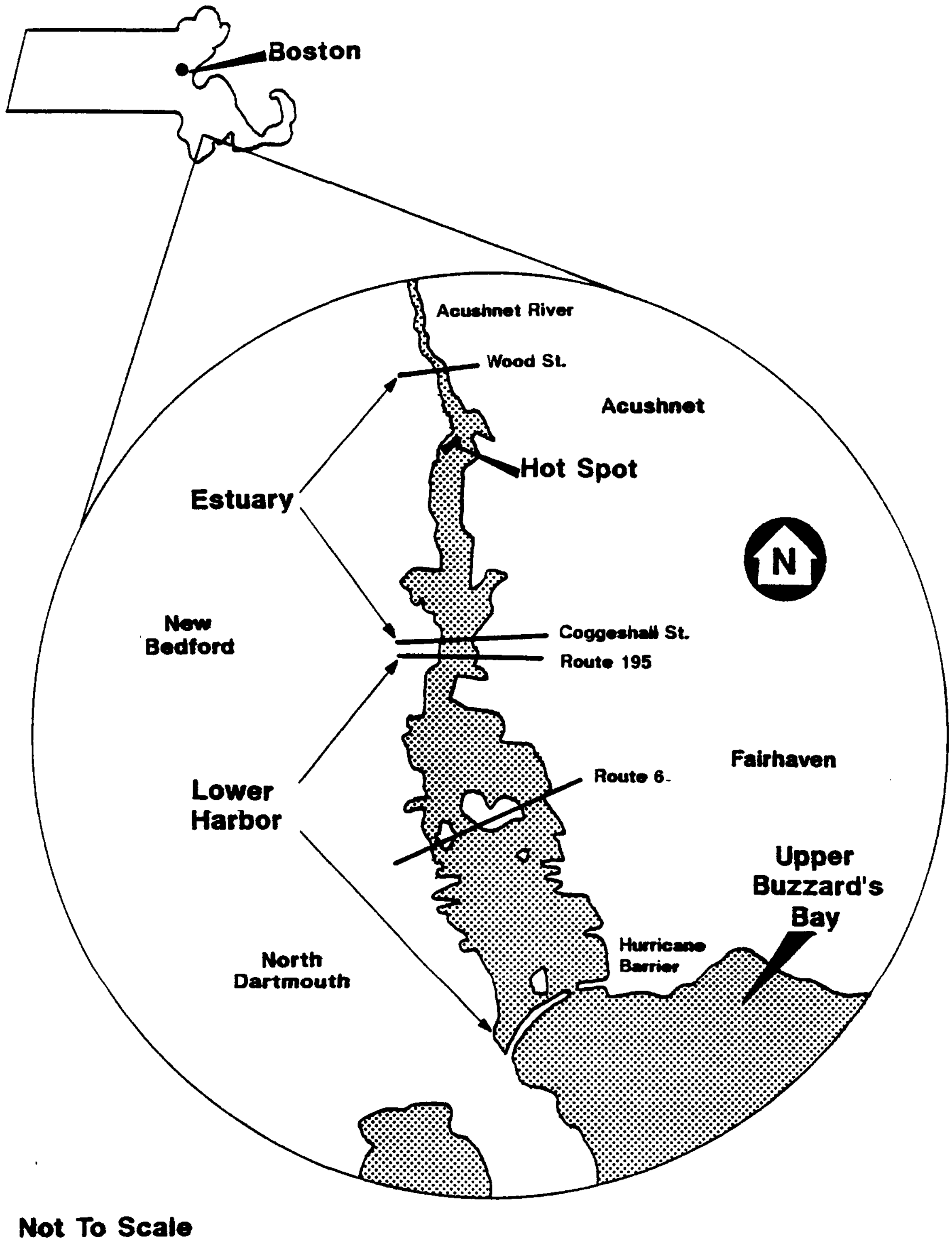

FIGURE 1-1
HARBOR LOCATION MAP
ESTUARY AND LOWER HARBOR
AND BAY FEASIBILITY STUDY
NEW BEDFORD HARBOR

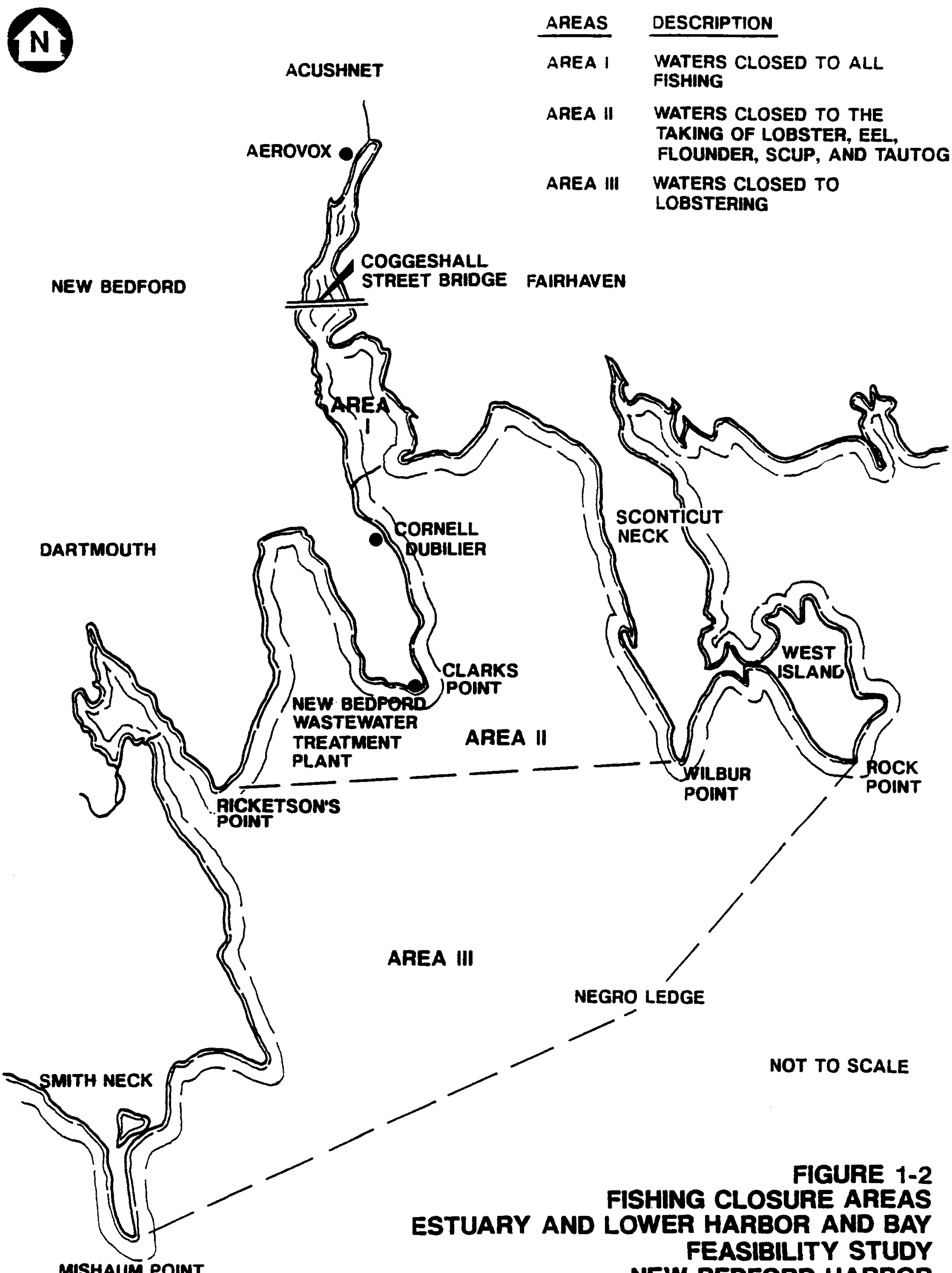

FIGURE 1-2
FISHING CLOSURE AREAS
ESTUARY AND LOWER HARBOR AND BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR

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has resulted in the loss of approximately 18,000 acres of productive lobstering ground.

In July 1982, New Bedford Harbor was added to the EPA Superfund National Priorities List (NPL), where it is currently listed in Group 2 as Site No. 76. New Bedford Harbor is the number one priority site in Massachusetts and was selected by the state in accordance with Superfund provisions. Following the NPL listing, EPA Region I initiated a comprehensive assessment of the PCB problem in the New Bedford area in August 1982. The assessment included sampling at the New Bedford and Sullivan's Ledge landfills; an areawide ambient air monitoring program; a sediment PCB profile for the Acushnet River and the harbor; biota sampling in the estuary, harbor, and bay; and a study of sewer system contamination. Results of this assessment were presented in a Remedial Action Master Plan (RAMP) for the site in May 1983 (Roy F. Weston, Inc., 1983). The RAMP included recommendations for studies to further delineate the contamination problems.

Concurrent with the assessment leading to the RAMP, EPA compiled a data base of sampling and analytical results of previous studies in the New Bedford Harbor and Buzzards Bay area. The final report on this data collection effort was issued by EPA in August 1983 (Metcalf & Eddy, 1983).

In 1983, NUS Corporation (NUS) prepared a work plan that included plans for a Feasibility Study (FS) of remedial action alternatives for the contaminated mudflats and sediment of the Acushnet River Estuary, north of the Coggeshall Street Bridge. This study was requested by EPA and the Commonwealth of Massachusetts because the levels of PCBs and heavy metals in these locations appeared to pose a near-term risk to public health, public welfare, and the environment. In October 1983, NUS received authorization to proceed with the FS for the upper estuary.

Upon completion of the upper estuary FS in August 1984, EPA sought public review and comment on the following five clean-up options:

- channeling of the Acushnet River north of the Coggeshall Street Bridge and capping of contaminated sediment in the remaining open water areas

- dredging of contaminated sediment and disposal in a partially lined confined disposal facility (CDF) located along the eastern shore in the northern part of the estuary

- same as the previous option, except that the CDF would be lined on the bottom as well as on the sides

- o dredging of contaminated sediment and disposal in a nearby upland containment site (no site was identified as available at that time)

- o dredging of contaminated sediment to an elevation well below the depth of contamination; contaminated dredged material would be placed in the bottom of the excavated cell and covered with a layer of clean sediment; the bottom of the upper estuary would be returned to its original elevation (disposal of contaminated sediment in subaqueous cells is termed confined aquatic disposal [CAD])

EPA received extensive comments on the options from other federal, state, and local officials; potentially responsible parties (PRPs); and the general public. Many of the comments concerned the adequacy of available dredging techniques and potential impacts of dredging on the harbor due to resuspension of contaminated sediment. The potential release of contaminated water (i.e., leachate) from an unlined disposal site was another issue of concern.

In attempting to respond to these comments, EPA determined it was necessary to conduct additional studies before choosing a clean-up method for the upper estuary. The focus of the proposed additional studies would be the feasibility of dredging and disposing of contaminated sediment. EPA asked dredging and disposal experts from the U.S. Army Corps of Engineers (USACE) to design and conduct these studies. In response to EPA's request, USACE conducted bench- and laboratory-scale studies, which comprised its Engineering Feasibility Study (EFS) of dredging and dredged material disposal alternatives for the Acushnet River Estuary (Averett and Francingues, 1988). Components of the EFS include (1) numerical modeling of sediment and contaminant transport during dredging; (2) studies of estuary sediment characterization, leachate and surface runoff from CDFs, subaqueous capping, solidification/stabilization (S/S) technologies, and settling and chemical clarification; and (3) conceptual designs of CDFs and CAD areas. The EFS was subsequently expanded to include a pilot study of dredging and disposal alternatives, which was conducted in New Bedford Harbor during the late fall and winter of 1988-1989.

In August 1986, Ebasco Services, Inc. (Ebasco) prepared a work plan to complete the FS for the entire New Bedford Harbor site under the REM III Superfund Program (Ebasco, 1986; and E.C. Jordan Co./Ebasco, 1986). Along with development of additional remedial alternatives for the site, the proposed scope of work included incorporating previous work conducted by NUS and the EFS and pilot study being conducted by USACE.

This FS was conducted for New Bedford Harbor by E.C. Jordan Co. (Jordan) under contract to Ebasco (EPA Contract No. 68-01-7250; Work Assignment No. 04-1L43). The goal of this study was to present EPA with a range of remedial alternatives to address the cleanup of PCBs and metals in New Bedford Harbor.

The New Bedford Harbor FS is divided into three geographical study areas: the Hot Spot Area, the Acushnet River Estuary, and the Lower Harbor and Upper Buzzards Bay (Figure 1-3). The Hot Spot Area is an approximate 5-acre area located along the western bank of the Acushnet River, directly adjacent to the Aerovox facility. A more detailed map of the Acushnet River Estuary and the lower harbor area is provided in Figure 1-4. Sediment PCB concentrations in this area range from 4,000 to more than 100,000 ppm. Total sediment metals (i.e., cadmium, chromium, copper, and lead) concentrations range from below detection to approximately 4,000 ppm.

The Acushnet River Estuary is an area of approximately 187 acres at +4 feet mean low water (MLW), extending from the Wood Street Bridge to the north, to the Coggeshall Street Bridge to the south (see Figure 1-4). Sediment PCB concentrations in this area (excluding the Hot Spot Area) range from below detection to approximately 4,000 ppm. Total metals concentrations in sediment range from below detection to more than 5,000 ppm.

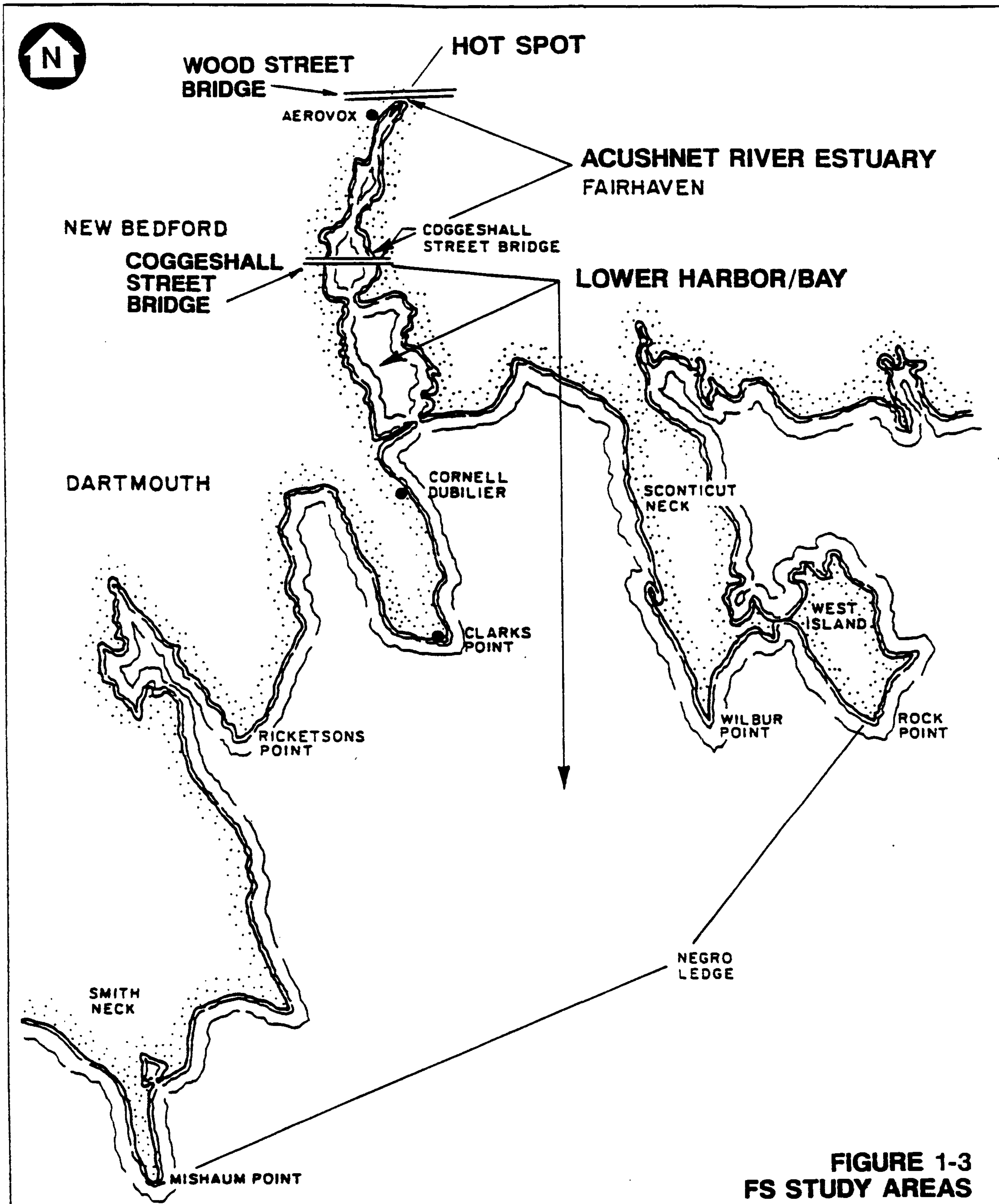
The Lower Harbor area consists of approximately 750 acres extending from the Hurricane Barrier, north to the Coggeshall Street Bridge. Sediment PCB concentrations range from below detection to more than 100 ppm. Total metals concentrations in sediment range from below detection to approximately 3,000 ppm.

The Upper Buzzards Bay portion of the FS study area extends from the Hurricane Barrier to the southern boundary of Fishing Closure Area III, an area of approximately 18,000 acres (see Figure 1-2). Sediment PCB concentrations in this area range from below detection up to 100 ppm in localized areas along the New Bedford shoreline near combined sewer and stormwater outfalls. The latter areas, comprising a few acres, will be evaluated for potential remediation as part of the FS for the estuary and the lower harbor/bay.

1.2 PURPOSE AND APPROACH

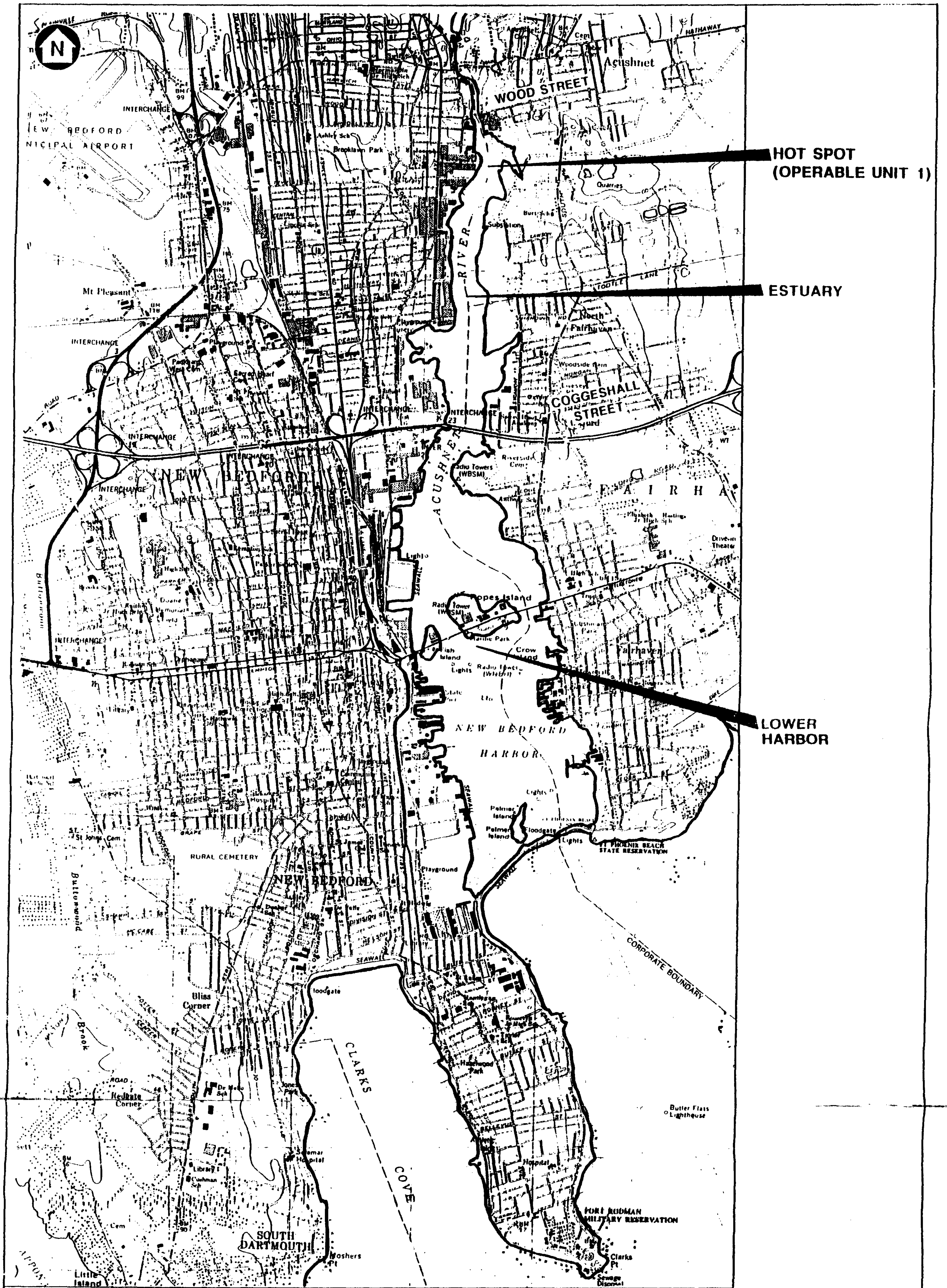
1.2.1 Operable Units for the New Bedford Harbor Feasibility Study

Operable units are discrete actions that comprise incremental steps toward a final remedy. They may be actions that completely address a geographical portion of a site or a specific site problem. In the spring of 1989, EPA Region I divided the New Bedford Harbor FS into two operable units: the Hot Spot Area and the estuary and lower harbor/bay.

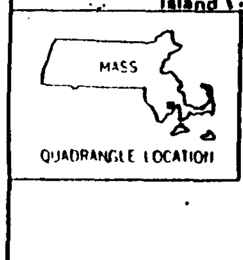


NOT TO SCALE

FIGURE 1-3
FS STUDY AREAS
ESTUARY AND LOWER HARBOR AND BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR



SOURCE: USGS QUADRANGLES;
NEW BEDFORD NORTH & SOUTH, MASS., 1977 & 1979



SCALE IN FEET

0 2000 4000

FIGURE 1-4
DETAILED MAP OF ESTUARY AND LOWER HARBOR
ESTUARY AND LOWER HARBOR AND BAY FEASIBILITY STUDY
NEW BEDFORD HARBOR

1.2.2 The Hot Spot Operable Unit

The 5-acre Hot Spot Area was chosen as an operable unit because it is a discrete, well-defined area that contains approximately 45 percent of the total PCB mass in sediment within the Acushnet River Estuary and New Bedford Harbor. The Hot Spot acts as a continuing source of contamination for the remainder of the estuary and lower harbor/bay areas. Thus, this operable unit addresses both a geographical portion of the site and a specific site problem. An FS of remedial alternatives for the Hot Spot Area was prepared and submitted to EPA Region I in July 1989 (E.C. Jordan Co./Ebasco, 1989b). The Hot Spot Area FS presented the following four remedial options, which had been evaluated in detail:

- no action
- dredging of contaminated sediment in the Hot Spot Area; incineration of the sediment with solidification as an optional treatment step to immobilize residual metals; disposal of the treated residue in an unlined shoreline CDF
- same as the previous option, but using solvent extraction as the primary treatment process
- dredging of contaminated sediment in the Hot Spot Area; solidification of the sediment and off-site disposal in a federally permitted facility

In August 1989, EPA Region I issued a proposed plan in which it selected the dredging and incineration alternative for the Hot Spot Area because, compared to the other alternatives evaluated, it offered the highest degree of contaminant destruction. The alternative is a highly reliable, well-proven technology for the treatment of organic waste, and it is a permanent remedy (EPA, 1989). EPA signed a Record of Decision documenting its selected remedy for the Hot Spot in April 1990.

The remedial action selected for the Hot Spot is an interim remedy which provides protection of human health and the environment through the removal and treatment of the highly contaminated sediments in the Hot Spot. Subsequent actions developed and evaluated in the second operable unit address fully the prinicipal threats posed by the remainder of the Site. The Hot Spot interim action is consistent with any planned future actions because this action calls for the removal of approximately 48 percent of the total PCB mass in sediment from the estuary portion of the Site, which acts as a continuing source of contamination throughout the entire Site.

1.2.3 <u>The Estuary and Lower Harbor/Bay Operable Unit</u>

The Acushnet River Estuary (excluding the Hot Spot Area) and the Lower Harbor/Upper Buzzard's Bay comprise the second operable unit for the New Bedford Harbor site. This report is the FS of the remedial alternatives for the estuary and the lower harbor/bay areas. Remedial alternatives for the estuary and lower harbor/bay separately are presented in Volume II. Site-wide remedial alternatives for the estuary and lower harbor/bay together are presented in Volume III. The purpose of the FS is to present EPA with a range of remedial alternatives that specifically address protection of human health and the environment from PCBs and metals in the estuary and the lower harbor/bay sediment, water, and biota.

The estuary and lower harbor/bay FS was conducted in accordance with the following legislation and guidance governing hazardous waste remediation:

- National Oil and Hazardous Substances Pollution Contingency Plan; <u>Final Rule</u> (FR 47912, November 1985)
- Superfund Amendments and Reauthorization Act (SARA) of 1986
- Guidance for Conducting Remedial Investigations and Feasibility Studies under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); <u>Interim Final</u> (EPA Office of Solid Waste Emergency Response [Oswer] Directive 9355.3-01; October 1988)
- National Oil and Hazardous Substances Pollution Contingency Plan; <u>Final Rule</u> (FR 8666, March 1990)

The remedial alternative selected for the estuary and lower harbor/bay will be consistent with the remedial strategy selected for the Hot Spot Area. The combination of the two will achieve the established Target Clean-up Levels (TCLs) for the overall New Bedford Harbor site.

1.3 REPORT ORGANIZATION

The estuary and lower harbor/bay FS report for the New Bedford Harbor project is divided into three volumes. Volume I (Section 1.0 through Section 5.0) and Volume II (Section 6.0 through Section 8.0) present discussions of the: site characterization; results of the human health and environmental risk assessment; applicable or relevant and appropriate requirements for the site; identification, screening, and detailed evaluation of remedial technologies; development and screening of remedial alternatives; detailed evaluation of remedial alternatives for the estuary and the lower harbor/bay separately; and a comparative analysis of these remedial alternatives. More complete descriptions of these report sections follow.

Section 2.0 presents the physical and chemical characterization of the estuary and the lower harbor/bay areas. The spatial extent of PCB and metals contamination is discussed, including the methodology used to calculate the area and volume of PCB contamination in the estuary and lower harbor/bay based on TCLs. Section 2.0 also discusses results of the hydrodynamic and sediment contaminant transport model conducted by Battelle Pacific Northwest Laboratories (Battelle) and the food chain model conducted by HydroQual, Inc. (HydroQual).

Section 3.0 summarizes the methodologies and results of the human health and environmental baseline risk assessments conducted for the overall New Bedford Harbor site.

Section 4.0 discusses applicable or relevant and appropriate requirements (ARARs) for the New Bedford Harbor site, followed by a summary of the sediment TCLs for protection of human health and environmental biota. This discussion forms the basis for the development of sediment TCLs, also presented in Section 4.0, that were selected for New Bedford Harbor and used in this FS for the detailed evaluation of remedial alternatives (Section 7.0). Section 4.0 concludes with a discussion of the remedial action objectives developed for the estuary and the lower harbor/bay areas. These objectives were used as guidelines for the subsequent selection of remedial technologies and the development and evaluation of remedial alternatives.

Section 5.0 presents the identification, screening, and detailed evaluation of remedial technologies for New Bedford Harbor. Section 5.0 is an inventory of applicable technologies that can be assembled into alternatives capable of meeting the remedial action objectives. Section 5.0 includes discussions and results of numerous technology studies conducted in support of the New Bedford Harbor Superfund project. Section 5.0 concludes with a summary of the remedial technologies considered applicable for the estuary and the lower harbor/bay.

Section 6.0 describes the development and screening of remedial alternatives for the estuary and the lower harbor/bay areas. A range of alternatives is developed as prescribed by SARA and EPA guidance for conducting FSs under CERCLA. The alternatives are screened on the basis of effectiveness, implementation, and cost. Remedial alternatives remaining after the screening are carried forward for detailed evaluation.

Section 7.0 presents the detailed evaluation of remedial alternatives for the estuary and the lower harbor/bay areas. Each alternative contains a conceptual design and an evaluation using the nine evaluation criteria prescribed by CERCLA Remedial Investigation/FS guidance (Interim Final, October 1988) and the NCP (FR 8666, March 1990). Some of the alternatives are similar enough to be discussed in the same subsection, which is done where possible.

Section 8.0 presents a comparative analysis of the remedial alternatives to evaluate the performance of each alternative relative to each specific criterion.

Volume III presents the detailed evaluation of additional site-wide remedial alternatives for the estuary and the lower harbor/bay together. Included is a discussion of the rationale for and a comparative analysis of these additional alternatives.

2.0 SITE DESCRIPTION

The New Bedford Harbor site has been the subject of numerous studies, which are cited in the Administrative Record. This section draws from and references many of these studies to describe the site history and to present the extent of contamination and potential transport and fate of PCB-contaminated sediment in the upper estuary and the lower harbor/bay areas.

2.1 BACKGROUND

Descriptions of the site history and socioeconomic setting, as well as details of the hydrologic and subsurface conditions in New Bedford Harbor, have been presented in detail in previously published reports (Weaver, 1982; and NUS, 1984a and 1984b). The following subsections present a general description of the New Bedford Harbor site.

2.1.1 Site Topography and Bathymetry

New Bedford Harbor is an estuary of the Acushnet River (see Figure 1-4). The Acushnet River drains a small basin of approximately 28 square miles above the Saw Mill Dam, located 0.4 mile above the Wood Street Bridge. The Wood Street Bridge is the approximate upstream limit of tidal influence. New Bedford Harbor is about 3.8 miles in length, extending from the Wood Street Bridge to the north, to the Hurricane Barrier to the south. The harbor can be subdivided into two major areas: the upper harbor or the Acushnet River Estuary; and the lower harbor, which opens into the upper reaches of Buzzards Bay.

2.1.1.1 Acushnet River Estuary

The Acushnet River Estuary is an area of approximately 187 acres (at +4 feet MLW) extending northward from the Coggeshall Street Bridge to the Wood Street Bridge, a distance of about 1.5 miles (see Figure 1-4). The estuary is bordered by New Bedford to the west and Acushnet to the east. The western side of the estuary is an active commercial zone for the City of New Bedford, consisting of light industrial and retail businesses. The eastern side of the estuary consists of an extensive wetlands area extending south from just below the Wood Street Bridge and the Acushnet Manufacturing Company, to within a few hundred yards of the Coggeshall Street Bridge. The wetlands along the eastern shore are mainly high saltmarsh and tidal flats encompassing approximately 70 acres of the estuary area (measured from an elevation of +4 feet MLW based on the USACE grid-coordinate system).

Water depths associated with the estuary vary considerably. At MLW, the greatest water depth is approximately 18 feet at the Coggeshall Street Bridge. Following the center of the river channel north toward the Wood Street Bridge, the water depth drops to 6 feet, decreasing to 2 feet at the head of the estuary. Current velocities of about 1.83 meters per second (m/sec) maximum ebb, 0.91 m/sec maximum flood, 0.52 m/sec average ebb, and 0.34 m/sec average flood have been measured at the Coggeshall Street Bridge (EPA, 1983b). Salinities in the estuary range from 26 to 30 parts per thousand (ppt), and have been reported as low as 12 ppt at the surface after a heavy rain (EPA, 1983b).

The sediments in the estuary are predominantly organic silts and marine clays. Grain-size analysis has shown that 40 to 80 percent of the sediments pass through a U.S. Standard No. 200 sieve. Moisture content of the sediments ranges from 30 to 60 percent by weight (GCA Corporation, 1983).

2.1.1.2 Lower Harbor

The lower harbor is an area of approximately 750 acres extending northward from the Hurricane Barrier to the Coggeshall Street Bridge, a distance of about 2.3 miles. The City of New Bedford borders the western side of the harbor, while the Town of Fairhaven borders the east. Both sides of the lower harbor provide extensive berthing and servicing facilities for the recreational boating and commercial fishing fleets. The eastern corner of the lower harbor adjacent to the Hurricane Barrier is lined with shorefront residences.

Water depths typically range from 6 to 12 feet except in areas adjacent to the federal- and state-maintained shipping channel, which is 30 to 50 feet deep. Current speeds are usually less than 0.32 m/sec. The lower harbor appears to be vertically well mixed with generally 1- to 2-ppt top-to-bottom differences in salinity (Teeter, 1988).

Sediments in the lower harbor are predominantly silty sands; that is, 60 percent sands within the upper reaches of the lower harbor, increasing to 90 percent sands in a seaward direction.

2.1.1.3 Upper Buzzards Bay

The portion of Buzzards Bay included within the New Bedford Harbor Superfund site extends from Mishaum Point on Smith Neck, to Negro Ledge to Rock Point on West Island. The extent of contamination in this area is discussed in greater detail in Subsection 2.2.3.

Water depths in the bay vary from tidal flats near shore to approximately 35 feet in the shipchannel. Sediments are predominantly sand.

2.1.2 Site Contaminants

2.1.2.1 Polychlorinated Biphenyls

PCBs were used from the early 1940s until the late 1970s by two manufacturing facilities located in New Bedford: Aerovox, located on Belleville Avenue on the western bank of the Acushnet River Estuary; and Cornell-Dubilier, located on Rodney French Boulevard approximately 0.4 mile south of the Hurricane Barrier on the western shore of upper Buzzards Bay.

The Aerovox facility used PCBs from 1947 to 1978 as impregnation fluids in the manufacture of electrical capacitors for applications ranging from fluorescent light ballasts to electronic equipment. Aroclor 1242, purchased from Monsanto Corporation, was used in substantial quantities until 1972 when Aroclor 1016 was introduced, completely replacing Aroclor 1242 as the impregnation fluid. Aroclors 1254 and 1252 were also used in smaller quantities. Between January 1973 and December 1975, more than four million pounds of PCB impregnation fluid was used at the Aerovox facility (Weaver, 1982).

The discharge of wastewater containing PCBs from the Aerovox facility has been documented by EPA (EPA, 1976). In addition to direct discharge of PCBs, waste capacitors have been disposed of in the estuary, and are considered a source of PCB contamination in the Hot Spot Area sediment (Weaver, 1982).

The Cornell-Dubilier facility also used PCBs from 1941 to 1977 in the manufacture of electrical capacitors for use in consumer products. Aroclor 1242 was used before 1971; from 1971 to 1977, Aroclor 1016 was used. Over three million pounds of Aroclor 1016 and approximately 22,000 pounds of Aroclor 1254 were used by Cornell-Dubilier from 1971 to 1975 (Weaver, 1982).

Cornell-Dubilier discharged process wastewaters to the municipal wastewater treatment plant via the City of New Bedford sewers. Wastewaters also were discharged to Buzzards Bay via combined storm sewer overflows. The presence of PCBs in these conduits downstream of the Cornell-Dubilier facility has been verified in numerous studies (Weaver, 1982). The areas of elevated sediment PCB concentrations in the outer bay coincide with the approximate locations of these combined sewer overflows, including an area surrounding the primary outfall from the treatment plant.

2.1.2.2 Metals

In addition to PCB contamination in the sediment, significant concentrations of heavy metals contamination in the sediment have been documented. The principal metal contaminants are cadmium, copper, chromium, nickel, lead, and zinc. Although point sources of these metals have not been explicitly identified, their presence has been attributed to discharges from metals plating and manufacturing and textile dyeing operations conducted in New Bedford during the last 80 years.

2.1.2.3 Other Contaminants

Numerous polycyclic aromatic hydrocarbons (PAHs) have been measured in New Bedford Harbor sediment (Pruell et al., 1990). The most abundant PAHs included phenanthrene, fluoranthene, pyrene, benz[a]anthracene, chrysene, and benzo[a]pyrene. These compounds are the by-products of combustion processes (i.e. gasoline and diesel fuel burning automobiles and boats). The major sources of these compounds are probably from urban runoff entering the harbor through combined sewer overflows and storm drains.

Polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) have also been detected in new Bedford Harbor sediment. It has been suggested that some of the PCDD and PCDF contamination in the harbor sediment is a result of long distance atmospheric transport (Pruell et al., 1990). PDCFs are known contaminants in commercial PCB mixtures and may have been released into the harbor along with the PCBs and possibly from atmospheric fallout resulting from the incineration of PCB-contaminated sewage sludge at the New Bedford municipal sewage treatment plant (Pruell, et al., 1990). Other unidentified sources may also have contributed PCDDs and PCDFs to the sediment.

2.2 EXTENT OF CONTAMINATION

This subsection provides an overview of the data used to assess contamination in the estuary and the lower harbor/bay, the methods used to interpret these data, an interpretation of the PCB and inorganic (i.e., heavy metals) contamination, and determination of the area and volume of sediment that would require remediation at four different PCB TCLs.

2.2.1 Sediment

The following sediment sampling data were used to determine the nature and distribution of PCB and inorganic contamination in New Bedford Harbor:

- o U.S. Coast Guard Sediment Sampling Program (1982)
- o NUS/Goldberg-Zoino Associates Harbor Grid Sampling Program (1986)
- o USACE Field Investigation Team Sampling Program (1986)
- o Battelle Hot Spot Sediment Sampling Program (1987)
- o USACE Wetlands and Benthic Sediment Sampling Program (1988)
- o USACE Hot Spot Sediment Sampling Program (1988)

These data sets were used for the estuary and the lower harbor/bay contamination assessment because of their similar sampling and analytical procedures.

The analytical data for New Bedford Harbor were acquired during a six-year period. The main focus of several of the sampling programs was to delineate the Hot Spot Area. Therefore, the data density in the remainder of the estuary and the lower harbor/bay is less than that of the Hot Spot Area. EPA believes the data sets are of adequate quality and demonstrate consistent results that can be used collectively to define the extent of contamination.

The focus of this FS is the estuary and the lower harbor/bay, the second operable unit for the New Bedford Harbor site. However, where necessary, references to and discussions of the Hot Spot Area (i.e., Operable Unit 1) are provided to establish continuity between the two FS reports.

2.2.1.1 Methodology for Sediment Data Interpretation

To determine the horizontal and vertical distribution of contamination in the estuary, PCB concentration maps were prepared from the data for three sediment depths: zero to 12 inches, 12 to 24 inches, and 24 to 36 inches. Except for the northernmost area, there was minimal contamination below 36 inches; therefore, maps were not prepared for depths below 36 inches. Sediment samples from each of the five sampling programs were marked on sample location maps for the three sediment depths. (Sampling location maps and associated data tables are presented in Appendix A.) PCB concentration contour maps were developed from the corresponding sample location maps by:

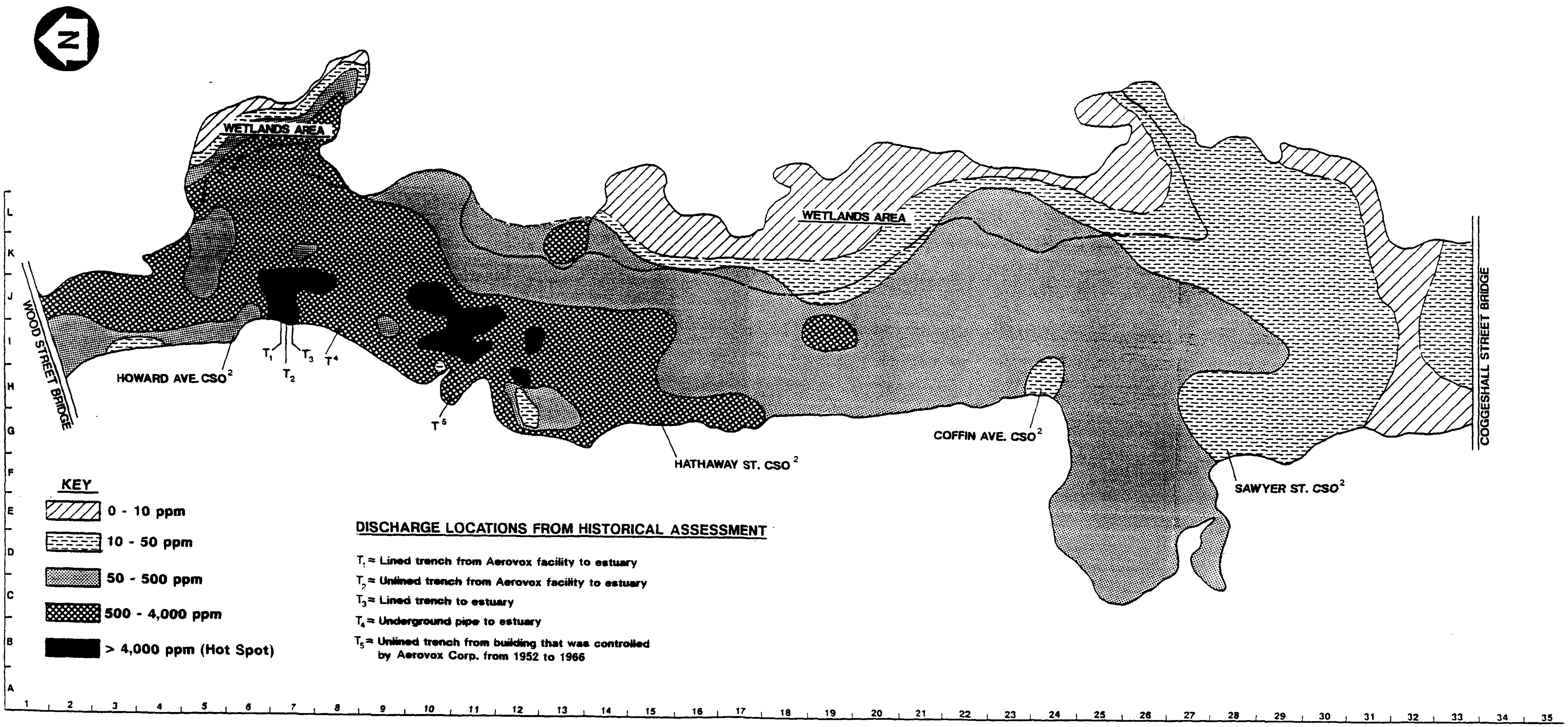
- assigning each sediment sample location the corresponding total PCB concentration (Aroclor summation)
- developing a contamination range for contouring
- contouring the sediment PCB concentrations to illustrate contaminant distribution

The following contouring procedure was used to delineate the horizontal distribution of contamination in the estuary. To enhance data interpretation, order-of-magnitude concentration ranges were established. As an example, the PCB ranges developed for the estuary are zero to 10 ppm, 10 to 50 ppm, 50 to 500 ppm, 500 to 4,000 ppm, and greater than 4,000 ppm. This range was developed to be consistent with the Toxic Substances Control Act (TSCA) definition of PCB-contaminated material (i.e., 50 to 500 ppm), PCB material (greater than 500 ppm), and the 4,000-ppm action level established to define the Hot Spot Area in the Hot Spot FS. Isoconcentration contours were derived by dividing the distance between sample points of different concentration ranges. For example, if the sample points differed by one range, the contour was drawn halfway between the points; for two ranges, the distance was divided into thirds, and the two contours drawn at these points. This method provides a qualitative assessment of contaminant distribution where there is adequate data density. The method used to extrapolate sediment volumes in the estuary and the lower harbor/bay is discussed in Subsection 2.2.4.

2.2.1.2 Polychlorinated Biphenyls

Figure 2-1 is a contour map of the PCB sediment contamination in the top 12 inches of sediment. PCB contamination is more widespread in the upper 12 inches of the sediment than at other depths. The hot spot areas (i.e., contamination at levels greater than 4,000 ppm) at this depth are clearly identified, comprising a total area of 5 acres.

Sediment PCB concentrations in the 500- to 4,000-ppm range surround the Hot Spot Area and extend northward toward the Wood Street Bridge, eastward into a cove area, and southward into the estuary. The presence of PCB contamination in these areas is attributed to PCB migration from the Hot Spot Area due to tidal fluctuations and wind-driven currents. Although PCB sediment contamination is in excess of 50 ppm throughout most of the estuary, concentrations decrease significantly with increasing distance from the Hot Spot Area. Concentrations in the lower reaches of the estuary, near the Coggeshall Street Bridge, are generally below 50 ppm.



REFERENCES

1. Historical Assessment of Aerovox - PCB Related Facility - New Bedford, Massachusetts.
2. Combined Sewer Overflow (CSO) locations from City of New Bedford sewer system map.

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FIGURE 2-1
INTERPRETATION OF TOTAL PCB CONCENTRATIONS *
DEPTH: ZERO TO 12 INCHES
ESTUARY AND LOWER HARBOR AND BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR

* SUM OF AVAILABLE AROCHLOR DATA

PCB contamination in the upper estuary extends into the wetlands located on the eastern side of Acushnet River. The concentration of PCBs in the wetlands area ranges from non-detect to greater than 1,000 ppm. Results of sampling conducted by Balsam Environmental Consultants, Inc. (Balsam) indicates a correlation between higher PCB concentrations (i.e., greater than 100 ppm) and the location of drainage ditches and tidal creeks (Balsam, 1989). Although there is evidence of bioaccumulation of PCBs in wetland biota, these areas continue to support a variety of plant and animal species typical of estuaries in southeastern New England, and are considered to possess high resource value (IEP, Inc., 1988).

Figure 2-2 is an interpretation of sediment PCB contamination in the 12- to 24-inch depth interval. PCB contamination at this depth is substantially lower than the surface interval, and the Hot Spot Area has been reduced to the northernmost area. Sediment PCB contamination in the 500- to 4,000-ppm range is limited to pockets located in the eastern cove area, in the area below the larger Hot Spot Area, and two areas located along the western shore. These two areas are located near combined sewer overflows.

In Figure 2-3 (24- to 36-inch depth interval), most of the estuary is below the 10-ppm level, with sediment PCB concentrations below the detection level in the lower estuary. The Hot Spot at this depth is limited to a small (northernmost) area. An additional area of PCB contamination at this depth interval is located adjacent to the combined sewer overflow on the western bank midway down the estuary. Concentrations of PCBs in the sediment from this area range from 50 to 4,000 ppm.

Figure 2-4 illustrates the interpretation of PCB data in the lower harbor/bay. Limited data were available for this area; most of the sampling points represent the zero- to 6-inch depth. Although the area of PCB contamination in the lower harbor/bay is more extensive than the estuary, the PCB concentrations in the sediment are markedly reduced from that of the estuary. Only one area in the lower harbor/bay had PCB concentrations exceeding 100 ppm. For this reason, the ranges of PCB concentrations used for contouring are different than those in the estuary. Five ranges were established for the lower harbor/bay to enhance data interpretation: less than 1 ppm, 1 to 10 ppm, 10 to 50 ppm, 50 to 100 ppm, and greater than 100 ppm.

Sediment PCB concentrations in the lower harbor/bay are greatest in the northern part of the harbor adjacent to the Coggeshall Street Bridge and the Route I-195 Bridge. This suggests that PCBs originating in the estuary are being transported to the lower harbor. The majority of deposition appears to occur in the northern part of the harbor between the Route I-195 and

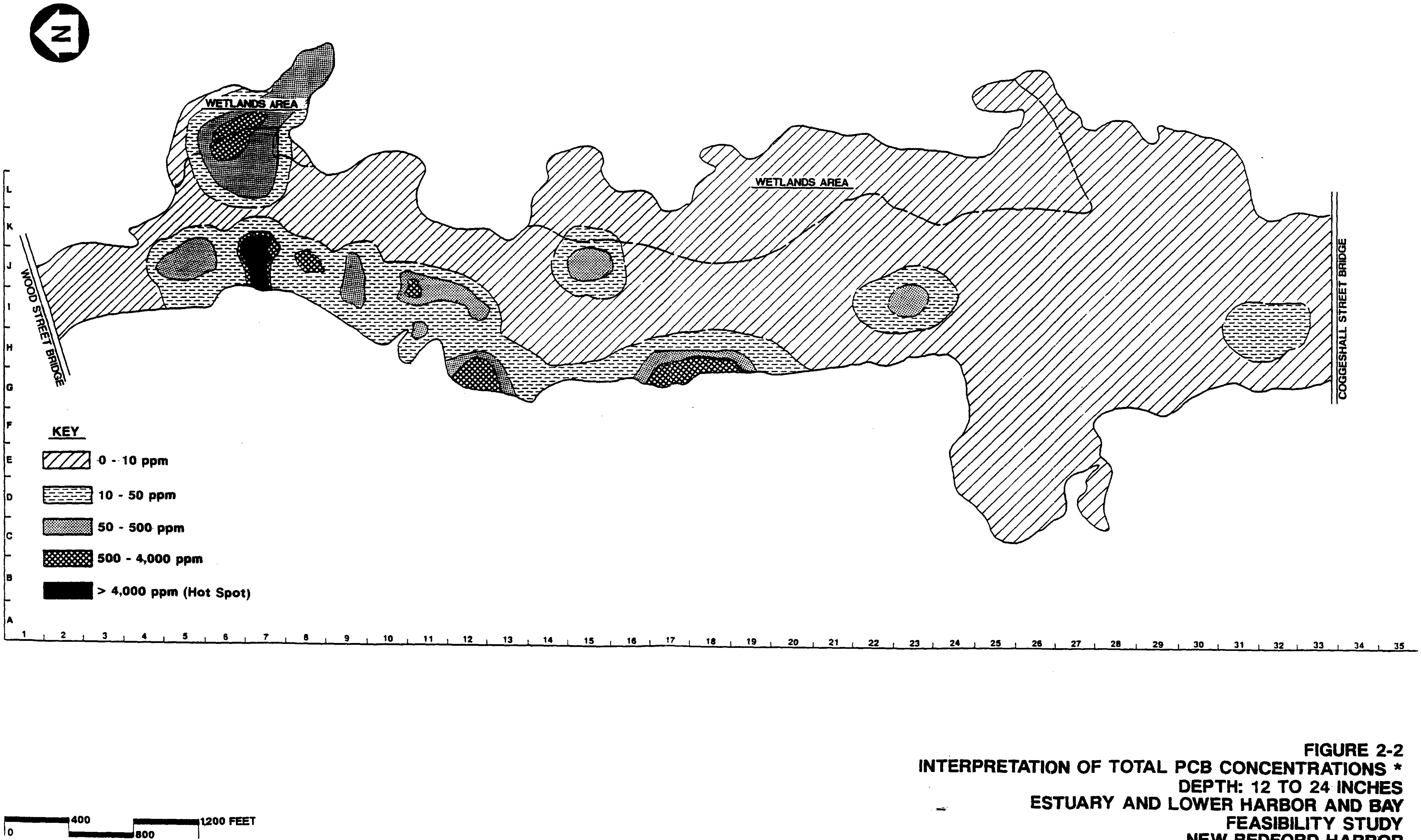

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FIGURE 2-2
INTERPRETATION OF TOTAL PCB CONCENTRATIONS *
DEPTH: 12 TO 24 INCHES
ESTUARY AND LOWER HARBOR AND BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR
* SUM OF AVAILABLE AROCHLOR DATA

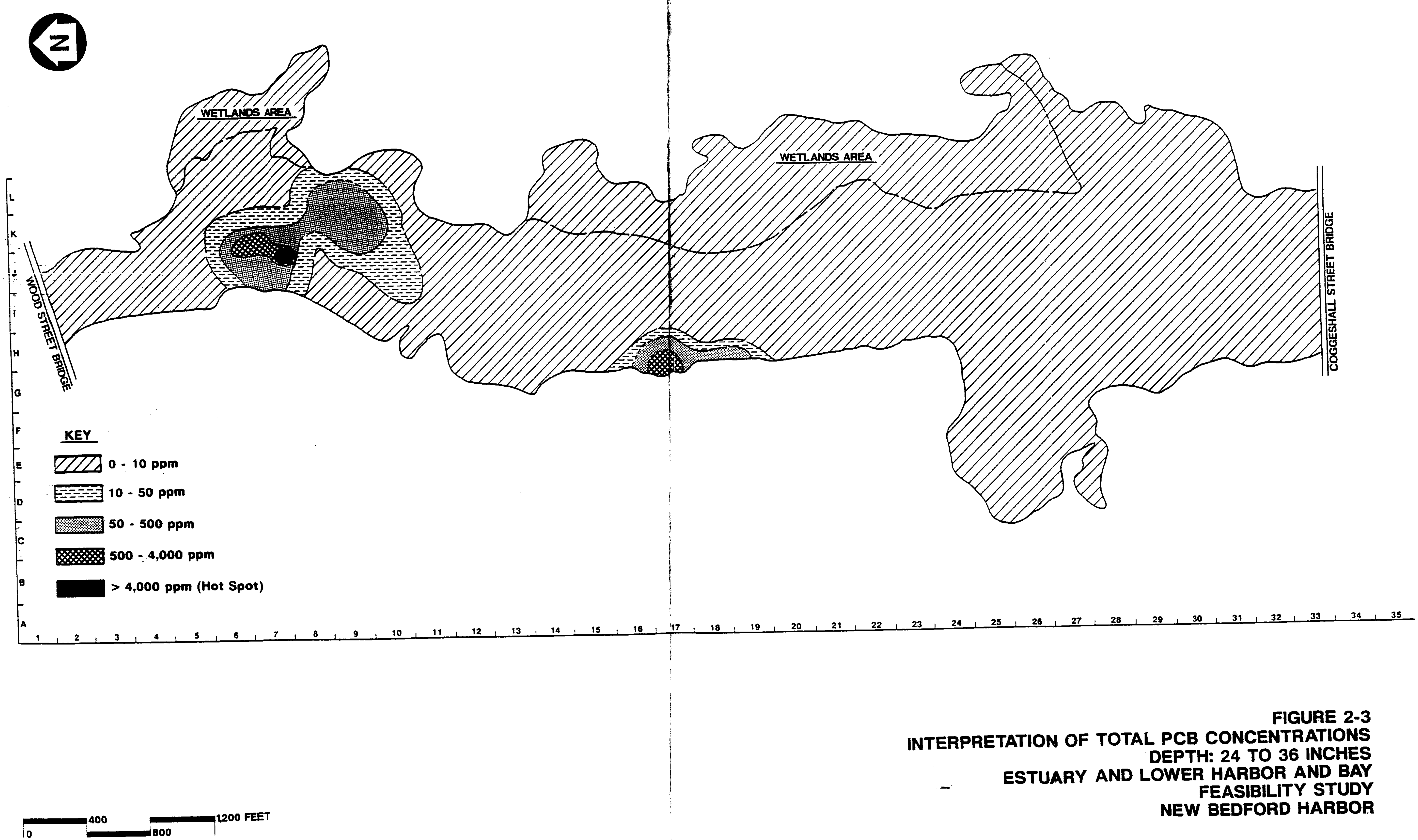

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FIGURE 2-3
INTERPRETATION OF TOTAL PCB CONCENTRATIONS
DEPTH: 24 TO 36 INCHES
ESTUARY AND LOWER HARBOR AND BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR

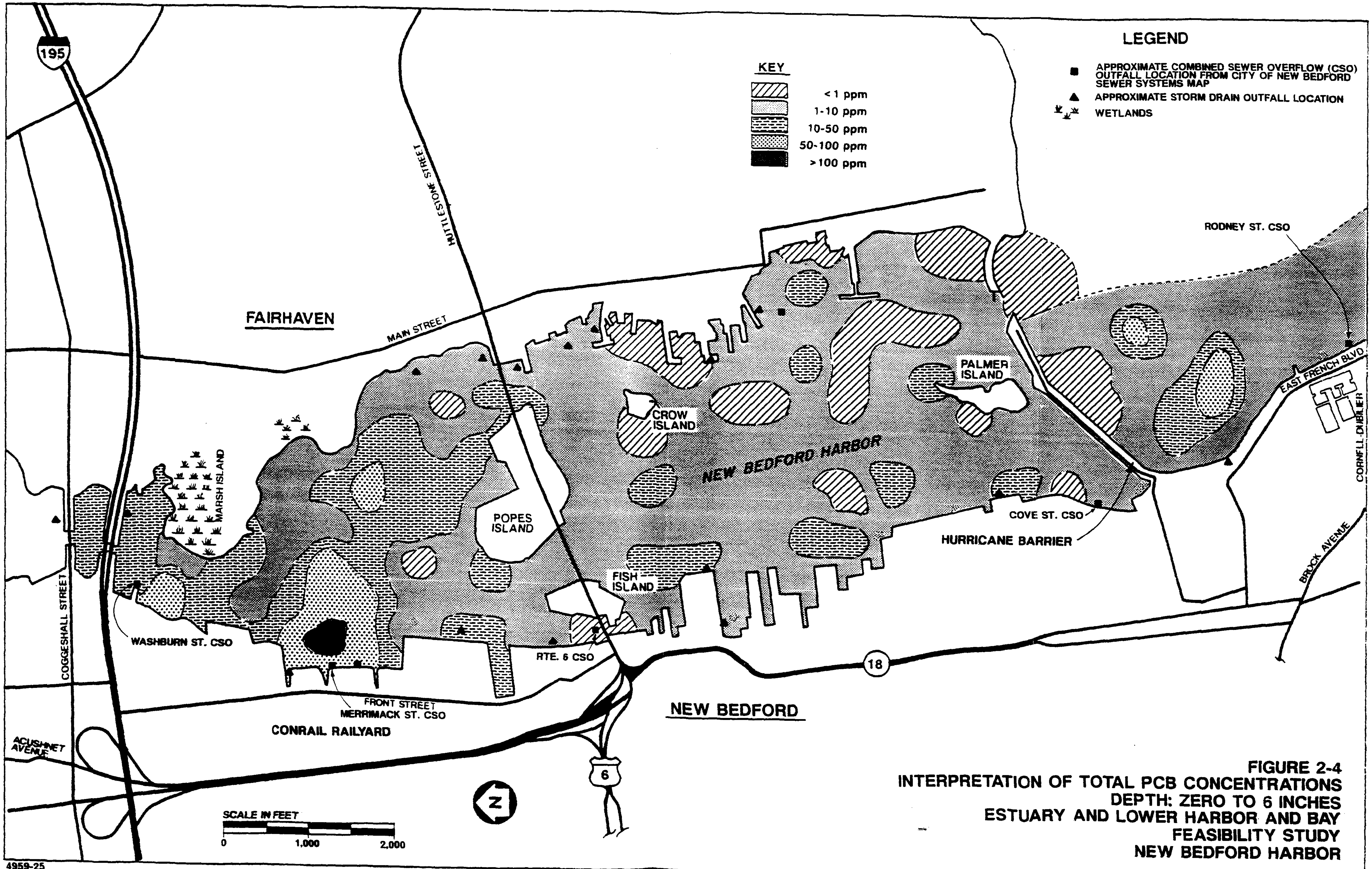


FIGURE 2-4
INTERPRETATION OF TOTAL PCB CONCENTRATIONS
DEPTH: ZERO TO 6 INCHES
ESTUARY AND LOWER HARBOR AND BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR

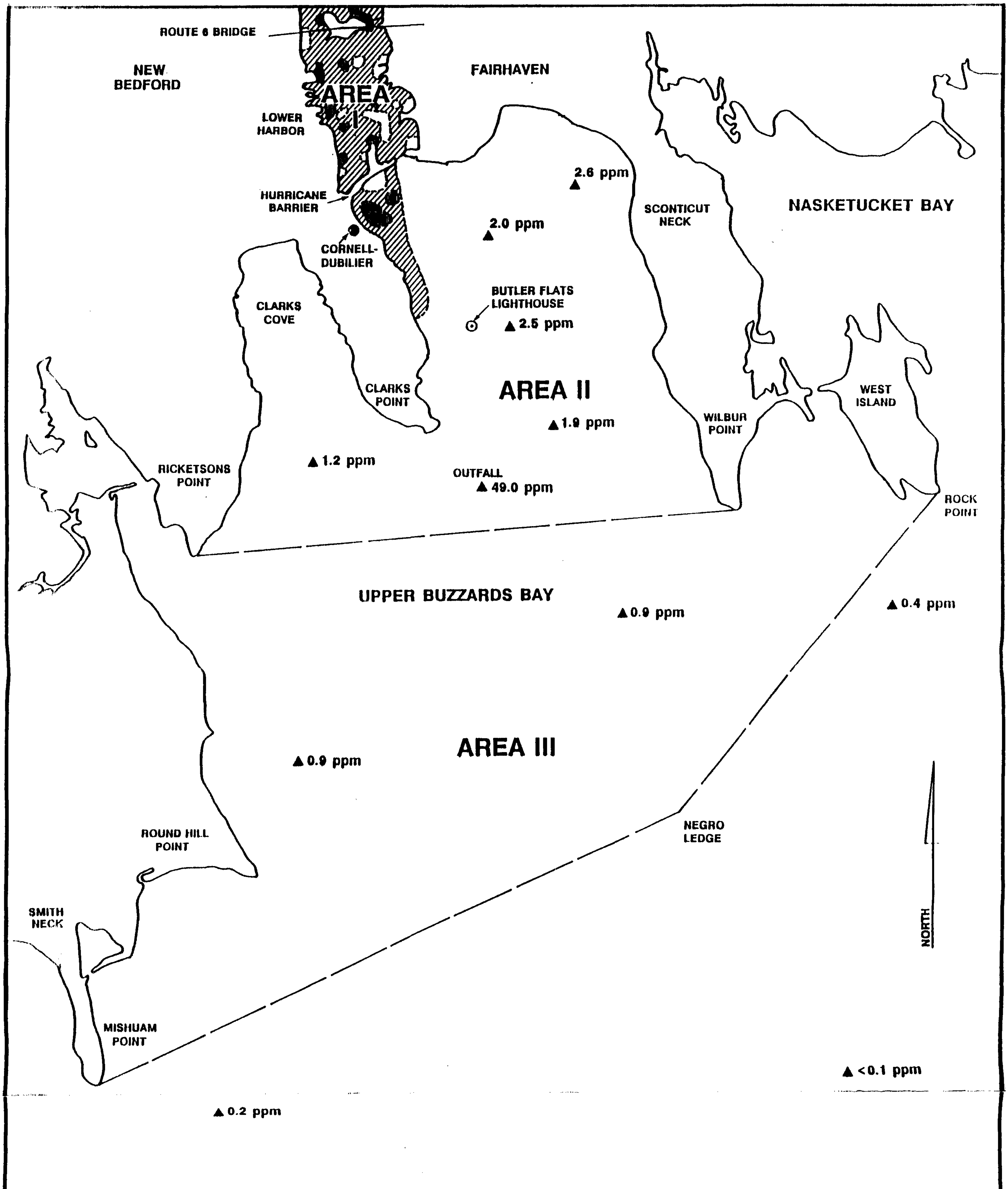
Route 6 bridges. There also appears to be an additional source in this area between the bridges, which is located off the New Bedford shore, opposite the Conrail railyard. This area was used for unloading PCBs from railroad tank cars, and is known to be contaminated with PCBs (NUS, 1986). It is suspected that runoff from this area entered storm drains and discharged into the harbor at this location.

The distribution of PCB sediment contamination between the Route 6 Bridge and the Hurricane Barrier is more random. The majority of the sediment in this area has PCB concentrations in the 1- to 10-ppm range; however, there are localized areas where PCB concentrations are less than 1 ppm and other areas that exceed 10 ppm (i.e., 10 to 50 ppm). The spotty distribution of PCB contamination may be attributed to the complicated hydrodynamics occurring within the area. Flow constrictions occurring at the bridges, the Hurricane Barrier, and near islands; tidal influence; and boat traffic within the harbor may all serve to create isolated scour and depositional areas. The primary source of PCBs for this area is believed to be from the upper estuary; however, PCB contamination from the Conrail railyard may also be a contributor.

South of the Hurricane Barrier, the most significant area of contamination is associated with the general location of the Cornell-Dubilier manufacturing facility (see Figure 2-4). Sediment sampling in and around the stormwater discharge areas identified PCB sediment contamination in excess of 50 ppm in two distinct locations. Figure 2-4A shows PCB sediment contamination in the 1-10 ppm range extending southward along the western shoreline of New Bedford from the Hurricane Barrier to just north of the Butler Flats Lighthouse. Limited sampling conducted in the rest of Upper Buzzards Bay (Figure 2-4A) indicates average sediment PCB concentrations generally less than 3 ppm within fishing closure Area II. One exception is a sampling point located at the New Bedford WWTP outfall where the average sediment PCB concentration was found to be 49 ppm. The data also suggest that sediment PCB concentrations within fishing closure Area III are below 1 ppm with even lower levels measured just south of the site boundary (i.e., outside fishing closure Area III).

2.2.1.3 Metals

The contour maps in Figures 2-5 through 2-7 show total metals concentrations (i.e., cadmium, copper, chromium, and lead) in sediment at depths of zero to 12 inches, 12 to 24 inches, and 24 to 36 inches. These maps were developed in a manner similar to the PCB maps from data collected by Battelle and USACE. (Sediment location maps and associated data points are presented in Appendix A.) The four metals were selected based on frequency of detection, concentration and quantity,



NOTES

1. PCB contour lines along the New Bedford shoreline are interpretations of total PCB based on the results of the Battelle and NUS/GZA sampling programs. Total PCB values displayed throughout the remaining portion of Buzzards Bay are average values from the Battelle sampling program. ▲ = Battelle sampling station

2. Fishing Closure Areas:
   - Area I - Waters closed to all fishing.
   - Area II - Waters closed to the taking of lobsters, eels, flounder, scup and tautog.
   - Area III - Waters closed to lobstering only.

KEY

- < 1 ppm
- 1 - 10 ppm
- 10 - 50 ppm
- 50 - 100 ppm

Only applicable along New Bedford shore between the Route 6 Bridge and Butler Flats Lighthouse.

0 1 2
APPROXIMATE SCALE MILES

FIGURE 2-4A

ESTUARY AND LOWER HARBOR/BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR

DISTRIBUTION OF TOTAL PCB IN
UPPER BUZZARDS BAY: 0 TO 6 INCHES

US EPA REM III PROGRAM

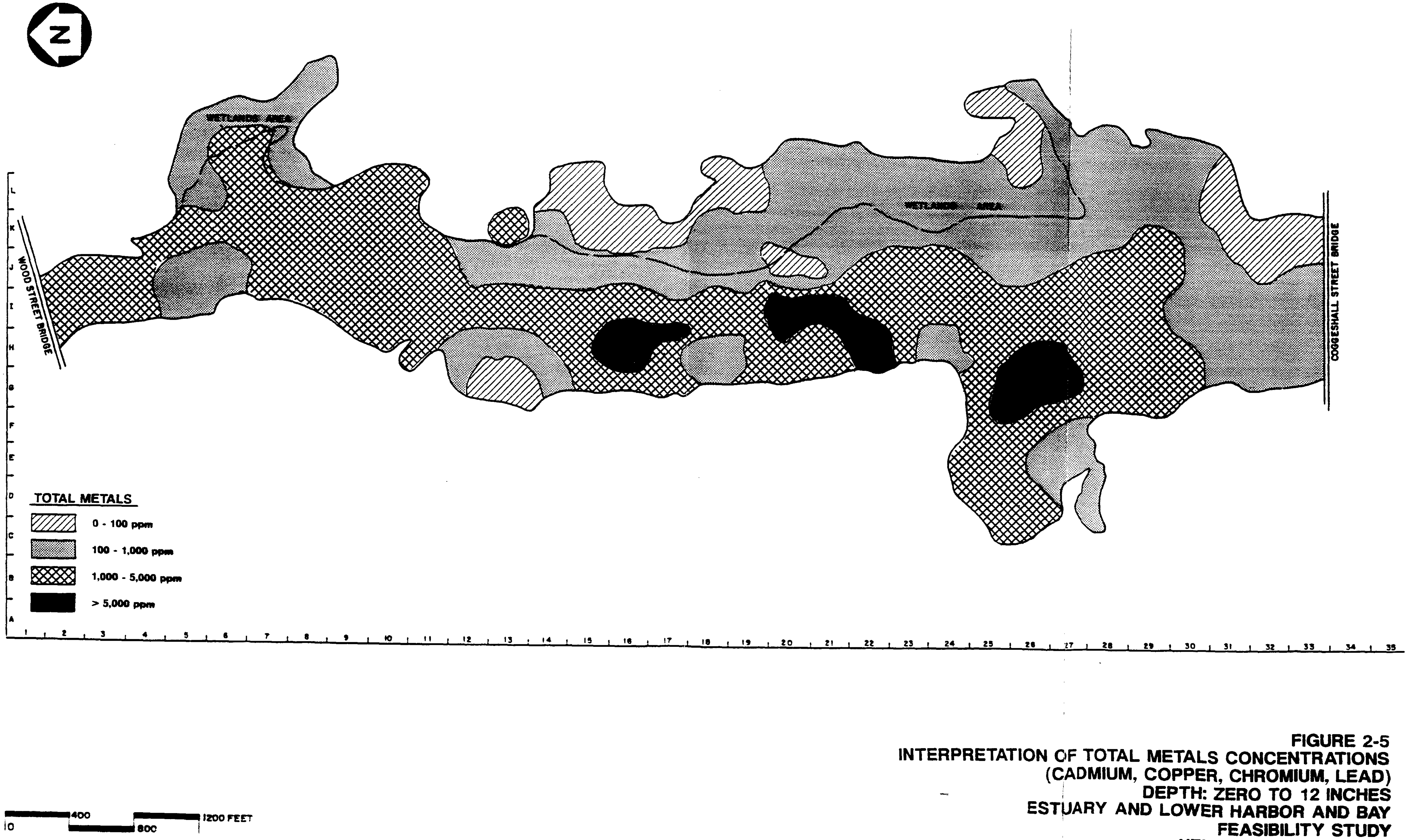


FIGURE 2-5
INTERPRETATION OF TOTAL METALS CONCENTRATIONS
(CADMIUM, COPPER, CHROMIUM, LEAD)
DEPTH: ZERO TO 12 INCHES
ESTUARY AND LOWER HARBOR AND BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR

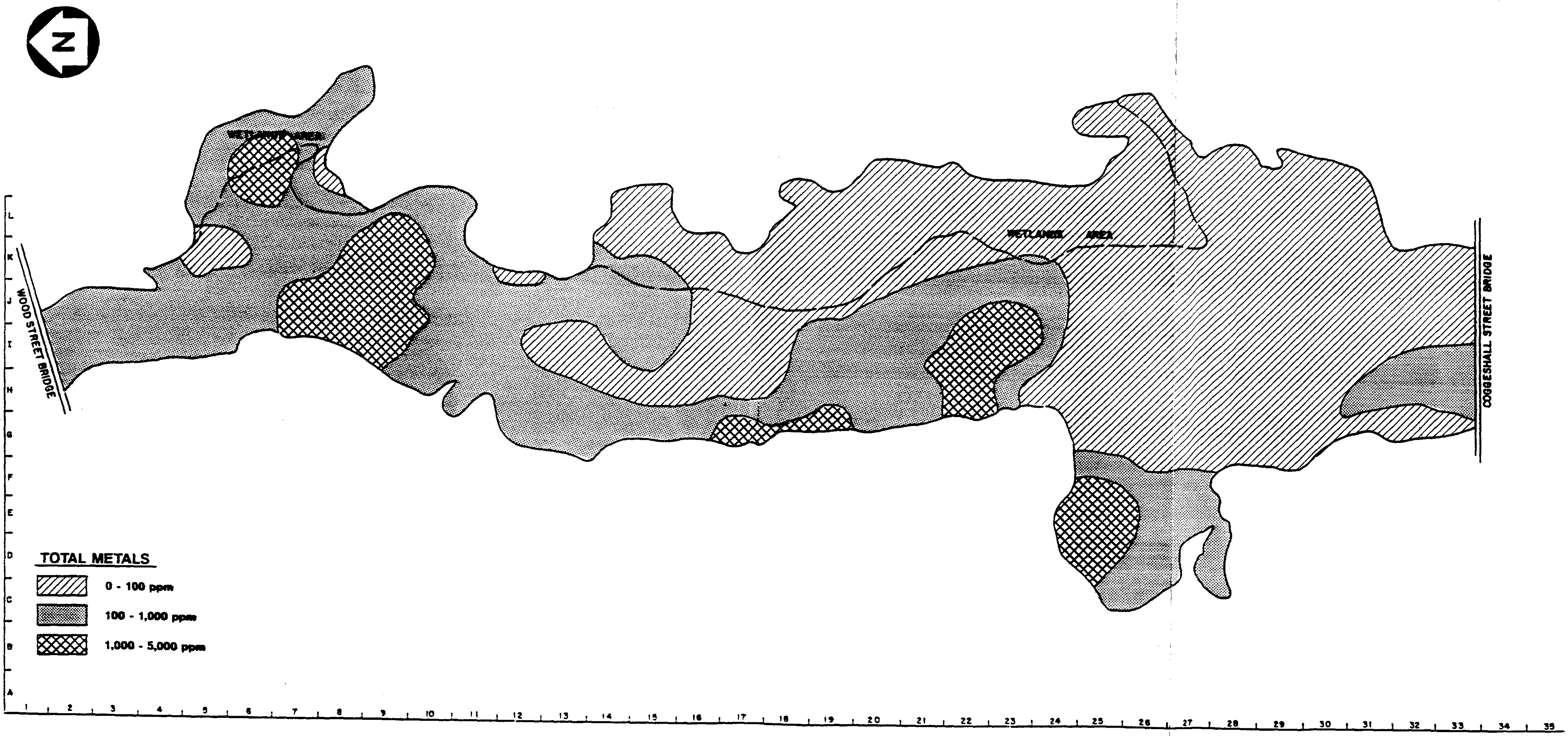


FIGURE 2-6
INTERPRETATION OF TOTAL METALS CONCENTRATIONS
(CADMIUM, COPPER, CHROMIUM, LEAD)
DEPTH: 12 TO 24 INCHES
ESTUARY AND LOWER HARBOR AND BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR

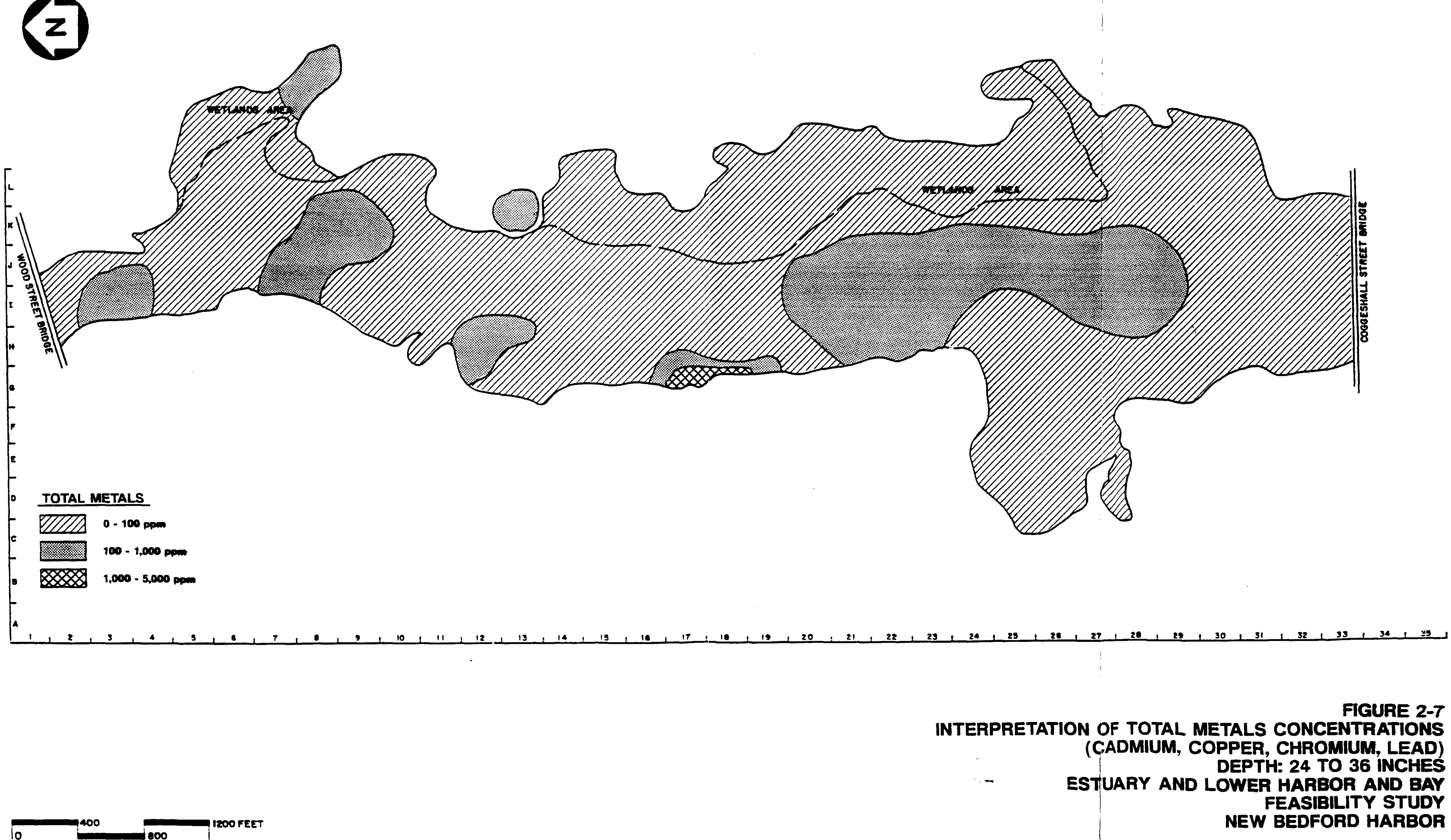


FIGURE 2-7
INTERPRETATION OF TOTAL METALS CONCENTRATIONS (CADMIUM, COPPER, CHROMIUM, LEAD)
DEPTH: 24 TO 36 INCHES
ESTUARY AND LOWER HARBOR AND BAY FEASIBILITY STUDY
NEW BEDFORD HARBOR

environmental mobility, and route-specific toxicity. Appendix A also contains contour maps for each of the four sediment metals. These maps were developed during the Battelle modeling program using available data. For the purposes of the FS, only the total metals maps were used. Where details of specific heavy metals contamination was required (e.g., during the risk assessment), the associated data points are discussed separately.

The metals concentration ranges illustrated in Figures 2-5 through 2-7 are different than those established for the PCB maps. The total metals concentrations were separated into four ranges: zero to 100 ppm; 100 to 1,000 ppm; 1,000 to 5,000 ppm; and greater than 5,000 ppm. These ranges were established to facilitate data interpretation and do not reflect any regulatory limits. In fact, heavy metals unlike PCBs are naturally found in sediments. Concentrations of heavy metals in the zero- to 100-ppm range may reflect natural or background conditions and not areas of contamination.

Similar to PCBs, the metals concentrations are greatest in the top foot of sediment, decreasing with depth. However, the area of high metals contamination (i.e., greater than 5,000 ppm) in the estuary is not within the PCB Hot Spot Area. Metals contamination appears to be greatest in the southern cove area. This area, as well as the western shore of the estuary, is heavily industrialized. The location of the high metals-contaminated sediment appears to correlate with the location of industrial discharge and/or combined sewer overflow discharge pipes.

Elevated metals concentrations were detected throughout the top 36-inch depth of sediments. Public health risks are associated with exposure to these metals (see Section 3.0); however, the risks comprise a small component of the total risk when compared to risks associated with exposure to PCB-contaminated sediment. The presence of metals in estuary area sediment is important because many treatment technologies capable of treating the PCBs are ineffective for treating metals. For this reason, additional treatment steps may be required to treat the metals remaining in the sediment after treatment for PCBs.

The interpretation of sediment metals contamination in the lower harbor/bay is illustrated in Figure 2-8. Figure 2-8 interprets the metals data in the top 6 inches of sediment. Insufficient data were available below the 6-inch interval for contouring. Total metals concentrations analyzed below this depth ranged from less than 10 ppm to greater than 2,400 ppm.

Metals contamination in the top 6 inches of the lower harbor/bay is highest in the area between the Route I-195 and Route 6 bridges. However, unlike PCB data, the estuary does not appear to be the main source of contamination. The most likely source

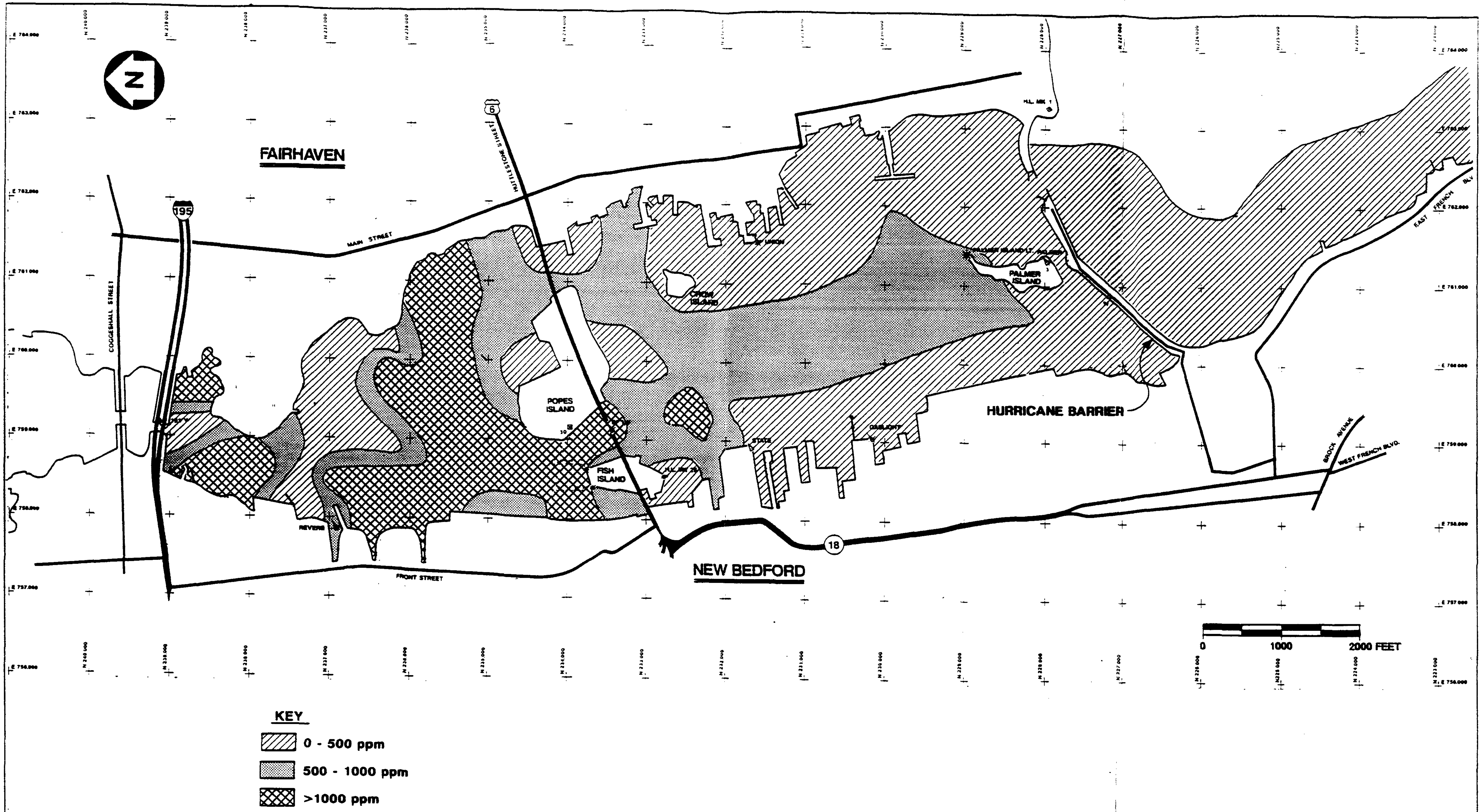


FIGURE 2-8
INTERPRETATION OF TOTAL METALS CONCENTRATIONS, ZERO TO 6 INCHES
(CADMIUM, CHROMIUM, COPPER, AND LEAD)
LOWER HARBOR AND BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR

of metals contamination in this area is the industrialized shoreline of New Bedford. Effluents from metal plating and manufacturing and textile dyeing operations were discharged throughout this area over an 80-year period and are suspected as the primary source of metals contamination (NUS, 1984a).

Metals contamination in the top 6 inches of sediment between the Route 6 Bridge and the Hurricane Barrier, and into the outer bay, is markedly decreased from the upper harbor area between the Route I-195 and Route 6 bridges. The highest concentrations are located in the vicinity of the Route 6 Bridge. Sediment metals concentrations decrease significantly with distance from this area to the outer bay.

With respect to remediation in the estuary and lower harbor/bay, most of the high metals concentrations are located in the top 1-foot layer of sediment, as are the higher PCB concentrations. Therefore, remediation of the PCBs would also remediate a large portion of the metals contamination. This is important from an engineering perspective because the removal/treatment alternatives selected for PCBs also will have to be effective for metals or recognize secondary waste management requirements for process residuals containing high metals concentrations.

Risk from exposure to metals was evaluated in the baseline risk assessment and is summarized in Section 3.0. In addition to potential risks caused by these contaminants, metals contamination in New Bedford Harbor is a concern from an engineering perspective. Heavy metals cannot always be treated with the same treatment technologies identified for PCBs, and may serve as a future source of contamination during any disposal of treated sediment.

2.2.1.4 Other Contaminants

PAH compounds were found to be co-located with PCBs; however, the range of PAH concentrations in the upper estuary sediment was significantly lower than the range of PCB concentrations. Total PAH concentrations range from below detection limit to 930 ppm with an average PAH sediment concentration of approximately 70 ppm (BOS, 1989). (The highest PAH concentration of 930 ppm was detected in the Hot Spot Area. Pruell et al. (1990) reported similar concentrations of PAHs in New Bedford Harbor sediments with the highest concentrations occurring in the upper estuary (maximum of 170 ppm). Further more, the relative distributions of PAH compounds were similar at all of the stations sampled in the estuary and the lower harbor areas. Although the PAH concentrations in the upper estuary are very high relative to PAH concentrations in the sediments of remote urban areas, the concentrations measured at New Bedford are similar to those measured at other northeastern urban estuaries including Black Rock Harbor, Narragansett Bay, and Quincy Bay, Massachusetts (Pruell et al., 1990). No discrete areas of elevated PAH levels were observed supporting the assumption that PAH contamination results from non-point sources such as urban runoff.

The relative toxicity of PAH compounds with respect to PCBs indicates that the majority of risk from exposure to sediment in the harbor will be attributed to PCBs. Because PAH compounds can be effectively treated by the technologies identified to treat the PCB contamination (see Section 5.0), methods employed to reduce PCB contamination will effectively reduce PAH contamination. However, unlike PCBs, the discharge of PAH compounds is expected to continue after remediation into the upper estuary from non-point sources. Therefore, remedial actions may not permanently reduce levels of these contaminants.

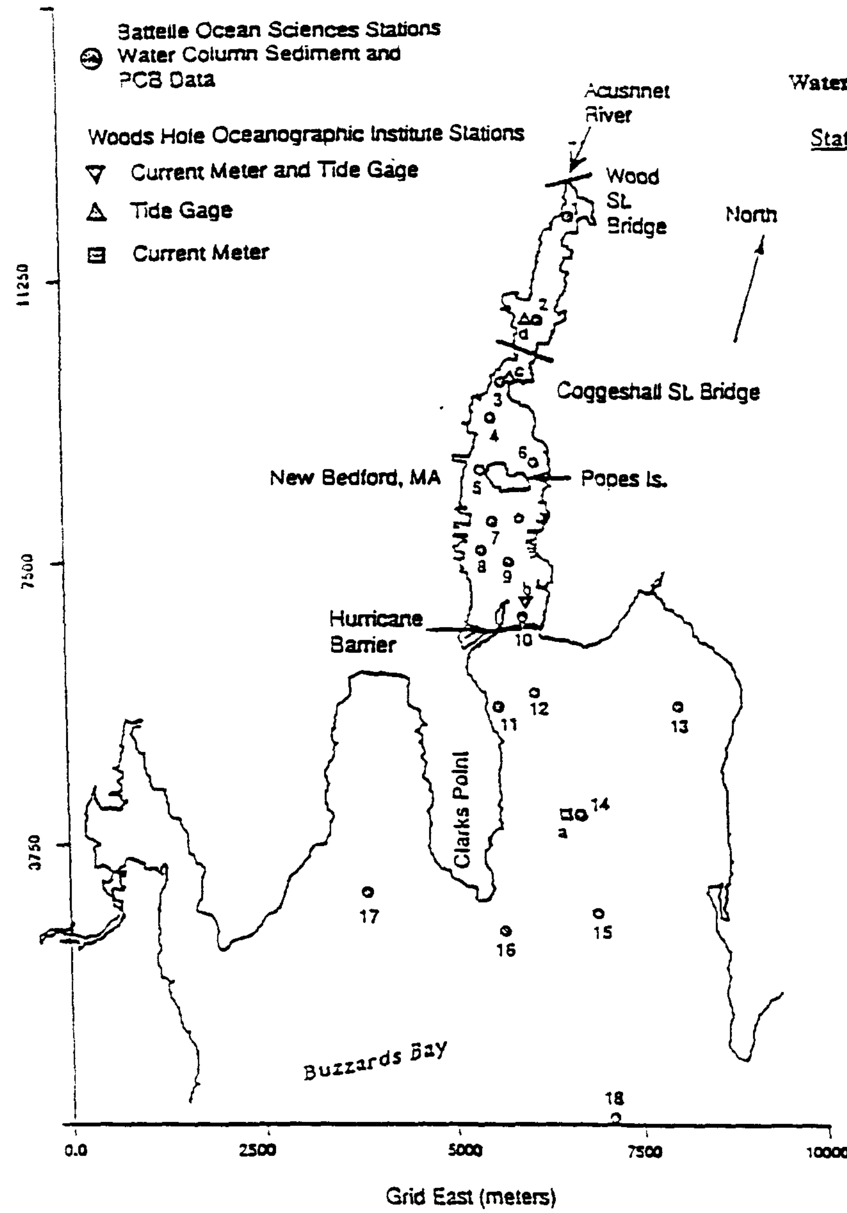
Pruell et al (1990) reported concentrations of PCDDs and PCDFs measured in sediments collected from four sites in New Bedford Harbor. Total PCDD concentrations ranges from 1,700 pico grams per gram (pg/g) to 8,100 pg/g with the lowest concentrations measured at a sampling station i the lower harbor and a sampling station near the Wood Street Bridge in the upper estuary. PCDD compounds containing seven and eight chlorines predominated while PCDD compounds containing four, five, and six chlorines were near or below analytical detection limits (ranging from 1 to 10 pg/g). The highly toxic 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) was only detected at a sampling station in the vicinity of the Aerovox facility at a concentration of 4.4 pg/g (detection limit of 1 pg/g) (Pruell et. al., 1990).

PDCF concentrations measured in the sediments from the same four sampling sites ranged from 140 mg/g to 9,000 pg/g (Total PCDFs) and reflected a concentration gradient to PCDFs.

2.2.2 Surface Water

Figure 2-9 shows surface water PCB concentrations measured at 18 sampling locations throughout New Bedford Harbor and Buzzards Bay in 1987 by Battelle Ocean Sciences. Mean PCB concentrations range from approximately 7,635 parts per trillion (ppt) in the upper estuary to 5 ppt in portions of Buzzards Bay (BOS, 1989). Surface water PCB concentrations throughout the estuary and the lower harbor exceed the Ambient Water Quality Criteria (AWQC) for PCBs (chronic effects on aquatic life) of 30 ppt.

The decreasing surface water PCB concentrations from the estuary toward the lower harbor/bay reflect the same gradient in sediment PCB concentrations. This correlation demonstrates the movement of PCBs into the water column. The water column data combined with PCB flux measurements at the Coggeshall Street Bridge and the Hurricane Barrier indicate that surface water is a major transport mechanism for PCBs.



Water Column PCB Concentrations

Station No.	PCB Conc. (ng/ℓ)[1]
1	7635
2	1021
3	269
4	209
5	170
6	318
7	93
8	142
9	91
10	111
11	90
12	46
13	15
14	26
15	14
16	25
17	12
18	5

Notes:

1. Water column PCB concentrations are based on the sum of geometric mean values for particulate and dissolved samples obtained from the respective sampling stations.

Reference:

"New Bedford Harbor Database," Battelle Ocean Sciences/Ebasco, 1989.

FIGURE 2-9
SURFACE WATER PCB CONCENTRATIONS
ESTUARY AND LOWER HARBOR AND BAY FEASIBILITY STUDY
NEW BEDFORD HARBOR

2.2.3 Biota

Sampling data show that aquatic biota at the New Bedford Harbor site are contaminated with PCBs. It is also known that aquatic biota bioaccumulate and bioconcentrate PCBs whenever biota come into contact with contaminated sediment or surface water, or via the ingestion of contaminated organisms.

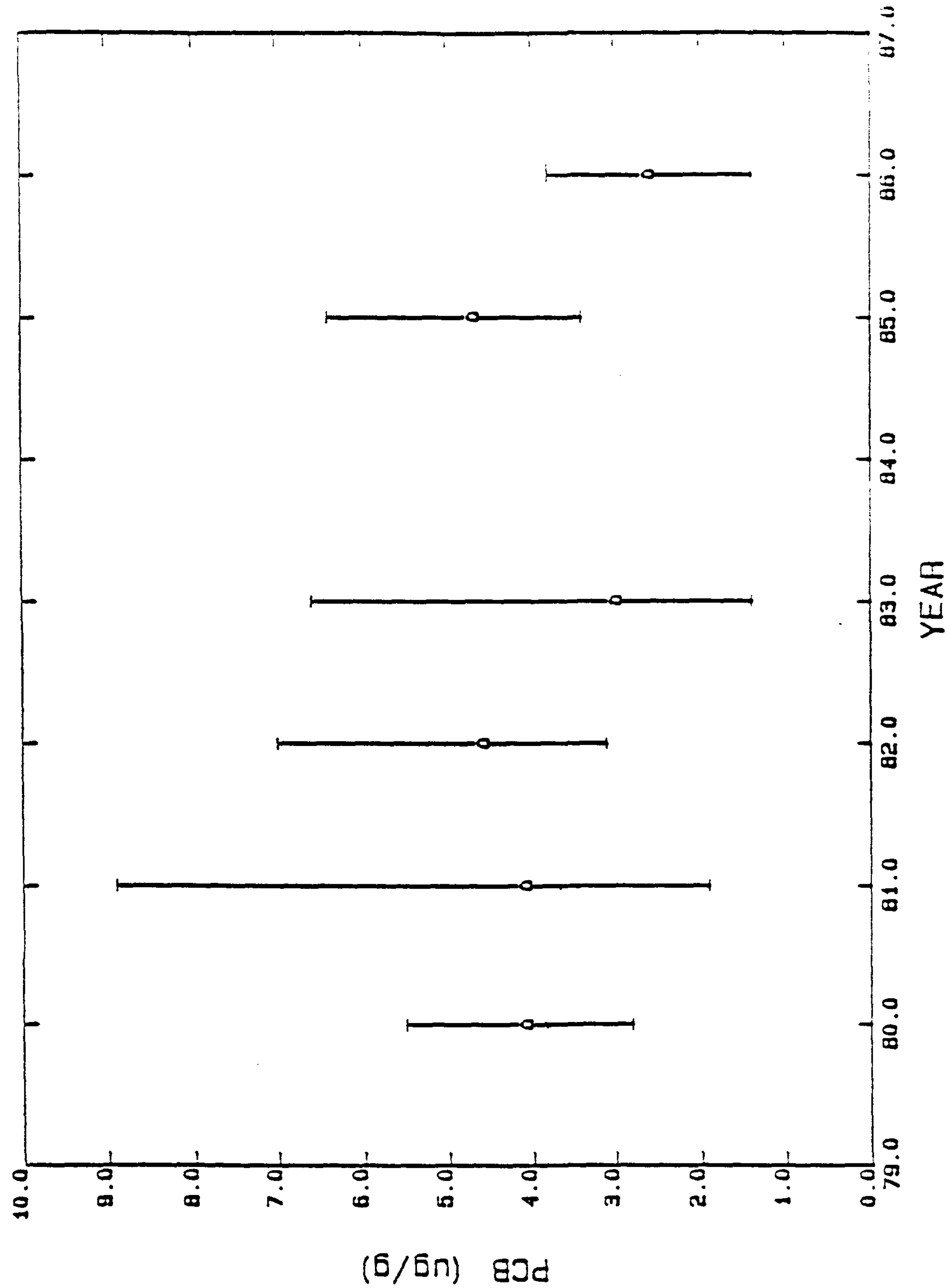
In certain biota, the edible portion was found to contain levels of PCBs in excess of the 2 ppm tolerance limit established by the Food and Drug Administration (FDA) in 1979.

Figure 2-10 summarizes lobster data collected in Area III (see Figure 1-2) by the Massachusetts Department of Marine Fisheries between 1980 and 1986 in accordance with FDA protocol. The results of this study indicate that lobsters show PCB levels in excess of 2 ppm. Additional biota data, including that generated by Pruell, et. al. and the Massachusetts Division of Marine Fisheries, also demonstrate that the FDA tolerance level continues to be exceeded (Pruell et. al., 1988).

Table 2-1 presents PCB concentrations in the edible portions of lobster, winter flounder, and clams collected by Battelle Ocean Sciences in 1987 (BOS, 1989). The biota were collected from areas that correspond to the DPH Fishing Closure Areas. The concentrations of PCBs in the lobster do not include concentrations fro the tomalley, the lobster liver, where PCBs bioaccumulate. Inclusion of the tamale is required by the FDA for calculation of compliance with its tolerance limit of 2 ppm. Using data generated by the EPA (1987) and a study by Pruell et. al. (1988), EPA estimated the total edible tissue PCB concentration for a typical lobster from Area II and predicted a significant increase in the PCB concentration (i.e., from 0.46 ppm to 2.3 ppm).

2.3 DETERMINATION OF SEDIMENT AREAS AND VOLUMES FOR POTENTIAL REMEDIATION

In practical terms, any remedial activities (i.e., capping or dredging) in the estuary and the lower harbor/bay would not be conducted using the contaminant isopleth maps developed in Subsection 2.2. To account for the operational limitations of dredging or capping activities, a grid-coordinate system would be used as a means of controlling and monitoring these remedial activities. A survey of the area to be remediated would be conducted to establish a grid-coordinate system for the site. Areas and volumes of contaminated sediment requiring remediation to achieve a desired TCL would be identified by individual grids. The grid locations would be used to guide remedial operations. Four potential TCLs were selected to calculate areas and volumes of contaminated sediment: greater than 1 ppm, greater than 10 ppm, greater than 50 ppm, and greater than 500



SOURCE: DEPARTMENT OF MARINE FISHERIES; SPRING SAMPLING

FIGURE 2-10
PCB CONCENTRATIONS (INCLUDING TOMALLEY)
FROM LOBSTERS IN AREA 3: 1979-1987
ESTUARY AND LOWER HARBOR AND
BAY FEASIBILITY STUDY
NEW BEDFORD HARBOR

TABLE 2-1

CONCENTRATIONS OF TOTAL PCBS (ppm) IN EDIBLE TISSUE OF BIOTA COLLECTED FROM NEW BEDFORD HARBOR NEW BEDFORD, MASSACHUSETTS

SPECIES	AREA I[1]	AREA II[1]	AREA III[1]	OUTSIDE OF CLOSURE AREAS[1]
American Lobster[2]				
Mean	0.906	0.568	0.213	0.064
Maximum	1.248	1.234	0.351	0.176
Winter Flounder[3]				
Mean	1.439	0.512	0.384	0.139
Maximum	3.628	1.446	1.138	0.469
Clam				
Mean	0.689	0.231	0.156	0.039
Maximum	2.121	1.181	0.478	0.137

NOTES:

1 = Areas refer to DPH Fishing Closure Areas
2 = Lobster concentrations do not include tomalley
3 = The edible tissue concentration was estimated using a whole body/edible tissue ratio of 0.18 (Battelle, 1990)
Mean = Arithmetic mean value of all samples collected
Maximum = Maximum value detected in each Area

Reference:

Battelle, 1987
E.C. Jordan/Ebasco, 1989a

ppm. Areas and sediment volumes in the estuary and the lower harbor/bay requiring potential remediation to a specified TCL are discussed in the following subsections.

2.3.1 Upper Estuary

The Acushnet River Estuary in New Bedford Harbor has been defined by USACE as a 187-acre area lying within the 4-foot MLW level (USACE-NED, 1990). USACE used a 250-by-250-foot grid-coordinate system to identify sampling locations during its estuary sampling programs. The USACE sampling grid was overlain onto the contaminant isopleth maps developed in Subsection 2.2. The area of the estuary requiring remediation for a given TCL was determined by counting the number of grids within the contour interval for that given TCL.

Grid areas on the edges of the contour interval were estimated to within a quarter of a grid. Because each grid represents an area of 1.43 acres (i.e., 62,500 square feet), the total area was determined by multiplying the number of grids by 1.43. For example, 114 grids were found to lie within the 10-ppm contour interval defined on the isopleth maps. Consequently, approximately 164 acres would require remediation for a PCB TCL of 10 ppm. Figure 2-11 shows the grid-coordinate system for the estuary area.

For remedial alternatives requiring removal of the sediment, isopleth maps were used to identify the sediment depth required to reach the residual TCL. This number was multiplied by the area in each associated grid and expressed as cubic yards (cy). For example, the PCB isopleth maps for the estuary indicate that removal of the top 2 feet of sediment would be sufficient to achieve the 10-ppm TCL in all except two areas: one area along the western shoreline and another area just south of the former Hot Spot Area. Although additional sediment sampling would be required to better define the depth, it was assumed that the removal of the next foot of sediment in those two areas would remove contaminated sediment in excess of 10 ppm. Therefore, the volume of sediment requiring dredging to leave a residual of 10 ppm was calculated to be the following:

$$(114 \text{ grids} \times [62{,}500 \text{ ft}^2/\text{grid} \times 2\text{-ft depth/grid}])/27 \text{ ft}^3/\text{cy} = 528{,}000 \text{ cy}$$

The areas and sediment volumes in the upper estuary requiring remediation to achieve other TCLs are presented in Table 2-2.

If the contaminated wetland areas along the eastern shoreline of the estuary study area were to be remediated as a component of the removal alternatives, an additional 43 acres would need to be addressed. Dredging at a 2-foot depth would be required to remediate the wetlands to the 10-ppm TCL. This would add

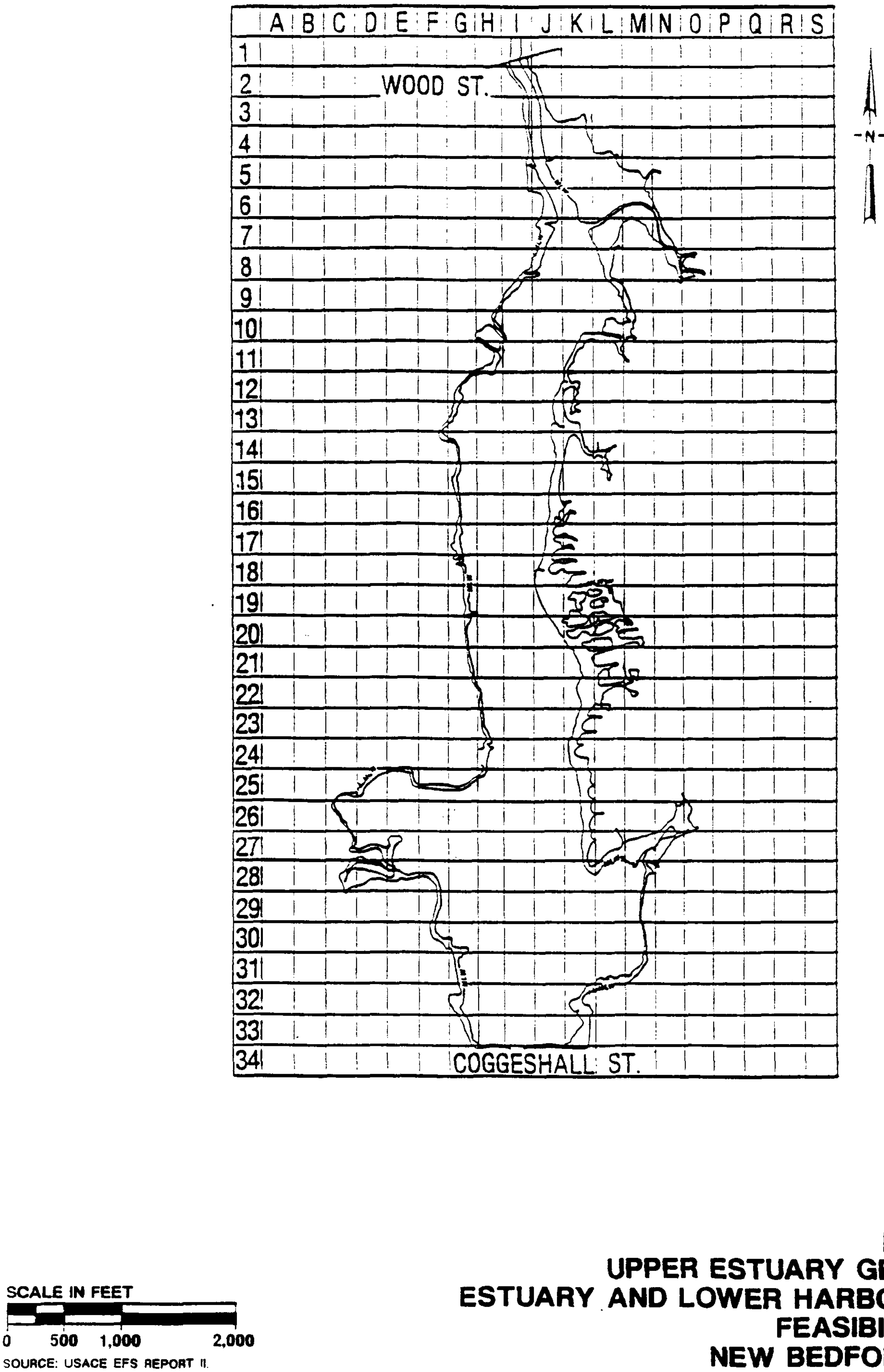


FIGURE 2-11
UPPER ESTUARY GRID SYSTEM
ESTUARY AND LOWER HARBOR AND BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR

TABLE 2-2
AREAS AND VOLUMES FOR ASSOCIATED TARGET CLEAN-UP LEVELS IN SEDIMENT

ESTUARY AND LOWER HARBOR/BAY FEASIBILITY STUDY

STUDY AREA	TARGET CLEAN-UP LEVEL (ppm)	VOLUME (cy)	AREA (acres)
Estuary	>1	572,000	187
	>10	528,000	164
	>50	378,000	118
	>500	149,000	46
Lower Harbor/ Bay	>1	1,584,000	981
	>10	398,000	246
	>50	76,000	47
	>500	7,000	4.3

NOTES:

ppm = parts per million

cy = cubic yards

approximately 139,000 cy to the total amount of sediment to be disposed of or treated.

2.3.2 Lower Harbor/Bay

The remedial areas and sediment volumes in the lower harbor/bay were estimated using the same method applied to the estuary. The USACE grid-coordinate system developed for the estuary was extended into the lower harbor/bay. However, due to the areal extent of the harbor, each grid was enlarged to 500 by 500 feet. Therefore, each grid represents an area of 5.74 acres (i.e., 250,000 square feet).

Available sampling data for the lower harbor/bay indicate that most of the PCB contamination in the sediment resides in the top 6 inches. Therefore, removal of the top foot of sediment (the minimum practical depth that could be removed during dredging operations) would achieve the 10-ppm TCL. Applying the grid to the PCB isopleth maps for the lower harbor/bay and assuming a TCL of 10 ppm, approximately 246 acres (or approximately 398,000 cy) would require remediation.

The areas and sediment volumes in the lower harbor/bay requiring remediation to achieve other TCLs are presented in Table 2-2.

2.4 CONTAMINANT TRANSPORT AND FATE

This section begins with a discussion of the mechanisms governing the transport of PCBs within New Bedford Harbor. A numerical, three-dimensional hydrodynamic and sediment-contaminant transport model is presented along with a discussion of other supporting transport studies. This section concludes with a discussion of the physical, chemical, and biological processes controlling the fate of PCBs on New Bedford Harbor. Included is a discussion of is a multi-level food chain model developed for New Bedford Harbor.

2.4.1 Transport of Polychlorinated Biphenyls

The horizontal and vertical transport of PCBs within New Bedford Harbor and upper Buzzards Bay is mediated by various physical, chemical, and biological parameters or processes that define this system, including tide, current, and wind; sorption/desorption between sediment and water; sediment deposition/resuspension; volatilization; and bioturbation.

As part of the New Bedford Harbor FS program, a three-dimensional hydrodynamic and sediment-contaminant transport computer model was developed and applied to New Bedford Harbor. The objective of this modeling program was to provide a physics-based analysis of contaminant transport and fate. In addition, the model served as a tool in the comparative evaluation of no-action and proposed remedial action alternatives over a 10-year future period. Of primary interest were the flux of PCBs between the bed and the water column, the effects of "clean sediment" deposition to the bed as a dilution factor, the volatilization of PCBs to the atmosphere, and the net tidal and non-tidal transport of PCBs throughout the system.

Detailed descriptions of the model, the model formulation used for New Bedford Harbor, and the hydrodynamics and sediment-contaminant calibrations are presented in a comprehensive report documenting the modeling program (Battelle, 1990). The components of the modeling program relative to the results discussed in this FS are described in the following subsections.

2.4.1.1 The TEMPEST/FLESCOT Model

The numerical model used in this study was the three-dimensional hydrodynamics code TEMPEST (Trent and Eyler, 1989), coupled with a sediment-contaminant transport submodel FLESCOT (Onishi and Trent, 1982). The marine version of TEMPEST solves the conservation equations of fluid mass, momentum, thermal energy, and constituent transport (e.g., salt) using standard finite-difference techniques. The sediment-contaminant transport submodel, FLESCOT, adds the following transport equations and associated source/sink terms to the TEMPEST code: suspended sediment, dissolved contaminant, and sediment-sorbed contaminant.

Sediments and sediment-sorbed contaminants are eroded from and deposited to a layered seabed. The model considers three sediment grain-size classes: sand, silt, and clay. Contaminant mass transfer between the sediment and the water column occurs through the erosion and deposition of sediment-sorbed contaminant, and direct desorption or adsorption through a sediment-water column partition coefficient and a rate constant. The FLESCOT model does not account for diffusion of contaminants within the interstitial pore waters of the bed sediments. The partitioning of contaminant in the water column between dissolved and sorbed form is modeled using an equilibrium partition coefficient and a rate constant. Nonconservative contaminants and the volatilization of dissolved contaminants are modeled as first-order rate processes.

2.4.1.2 TEMPEST/FLESCOT Formulation for New Bedford Harbor

The TEMPEST/FLESCOT model was applied to New Bedford Harbor and portions of adjoining Buzzards Bay. This area was divided into a 46-by-46-by-8 nonuniform Cartesian grid. A plan view of the computational grid and key geographical points is shown in Figure 2-12. The bathymetry was defined using information obtained from the National Oceanic and Atmospheric Administration Buzzards Bay Chart (#13230) and recent surveys

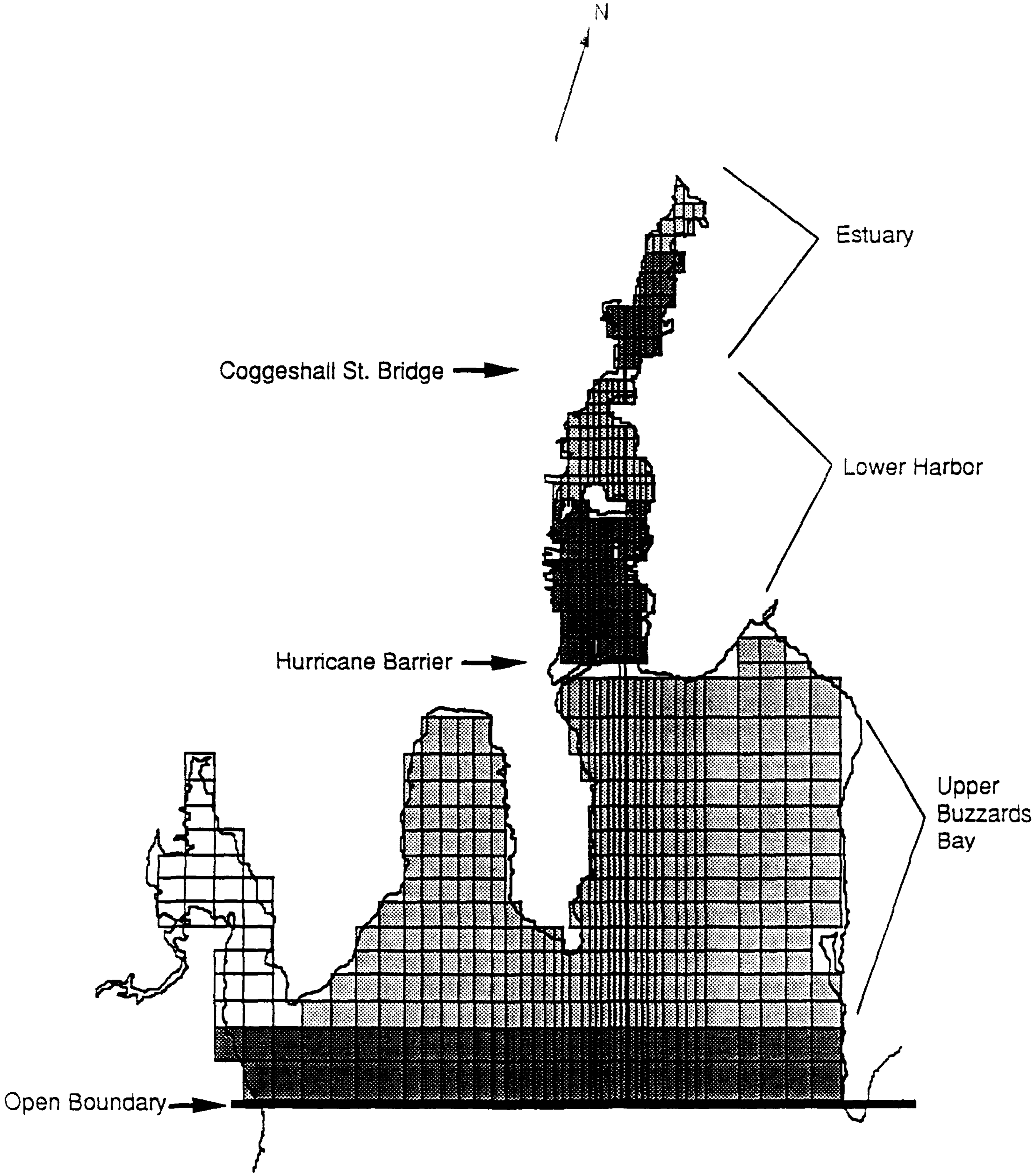


FIGURE 2-12
COMPUTATIONAL GRID FOR TEMPEST/FLESCOT MODEL
ESTUARY AND LOWER HARBOR AND
BAY FEASIBILITY STUDY
NEW BEDFORD HARBOR

4959-25

conducted by USACE. Depths in the modeled area range from 0.3 to 10 meters below the MLW level.

Freshwater inflow from the Acushnet River was ignored because of its low average annual flow rate; that is, approximately 0.85 cubic meters per second (Teeter, 1988).

2.4.1.3 Calibration of the TEMPEST/FLESCOT Model

Hydrodynamics were calibrated using two 24-hour periods simulating site conditions: an M2 tide (12.42-hour period) and northerly 2- to 10-m/sec winds. Wind speed and direction were applied uniformly over the computational domain. The computed results of these simulations were compared with measured field data collected during the calibration periods by USACE (New England Division) and Woods Hole Oceanographic Institution (WHOI). USACE measured wind speed and direction at the Hurricane Barrier. WHOI measured current velocities and direction, and water surface elevations using current meters and tide gauges deployed at various locations throughout New Bedford Harbor. Details on these field data collection activities are presented elsewhere (Battelle, 1990). The effects of episodic storm events, with a monthly recurrence interval, were incorporated using a 24-hour simulation forced by an M2 tide and southerly 1- to 15-m/sec winds.

Sediment-PCB calibration simulations covered a 95-day period in the following five sequential stages: (1) 30-day general case, (2) 1-day storm case, (3) 30-day general case, (4) 1-day storm case, and (5) 30-day general case. The final water column and sediment bed conditions for one stage served as the initial conditions for the next stage.

Initial conditions for bed sediment grain-size distribution and total PCBs sorbed to bed sediments were assigned based on field survey data. To obtain a sufficient level of detail to assign seabed conditions throughout the computational domain of the model, several sets of data collected at different times had to be used. Details on how these data sets were selected and used are discussed by Battelle (Battelle, 1990).

The FLESCOT model formulation for New Bedford Harbor assumes a sediment bed depth of only 4 centimeters (cm) as the active zone over which mass transfer of PCBs from the sediment to the overlying water column occurs. The initial sediment PCB concentrations assigned in the model reside in this 4-cm surficial sediment layer. In reality, sediment PCB concentrations are significantly higher at depths greater than 4-cm throughout most of the area modeled. Numerous mechanisms, including sediment scouring and erosion, diffusion, or bioturbation, could make the highly contaminated sediments below the 4-cm surficial layer available for transport into the overlying water column. Therefore, numerical results of the modeling program should not be viewed as absolute but rather as a reflection of relative changes occurring in the New Bedford Harbor system.

Sediment and PCB transport was calibrated by comparing computed values to water column data collected by Battelle in 1985 at various sampling station locations throughout New Bedford Harbor and upper Buzzards Bay (Battelle, 1990). Simulation results using the final set of parameter values were compared to the Battelle field data. Agreement between the calculations and measurements was fair; the mean computed value was within the range of the observed data at most stations.

The net computed flux of suspended sediments and PCBs (in kilograms per tidal cycle) through the Coggeshall Street Bridge constriction was compared with those measured by Teeter (Teeter, 1988) and Teeter's corrected values of EPA (1983) data. As shown in Table 2-3, the model produces the correct net transport direction, although the computed results are lower than the measurements. One reason for the lack of agreement is that the field measurements were made under tide and wind conditions different than those used in the model simulations.

2.4.1.4 Transport Processes Simulated by the TEMPEST/FLESCOT Model

The net flux of suspended sediments and total PCBs was calculated at several planes in the computational grid. The flux calculation planes, shown in Figure 2-13, were chosen to correspond to the principal constrictions in the system (e.g., the Coggeshall Street Bridge and the Hurricane Barrier) and the open boundary of the model. In addition to the flux information, the computed sediment and PCB values in each water column and seabed grid cell were averaged over six zones. Zones 1 and 2 encompass the upper estuary, Zones 3 and 4 the lower harbor, and Zones 5 and 6 the outer harbor or upper Buzzards Bay. Locations of the averaging zones are shown in Figure 2-13. Using this information, it was possible to perform mass balances over key geographic regions in the study area.

The net flux of suspended sediments and total PCBs computed in the calibration simulation is summarized in Table 2-4. The calibration simulation incudes the Hot Spot area in the upper estuary. The results show that the upper estuary and the inner harbor are depositional areas for sediment. In the area south of the Hurricane Barrier, sediments are being transported out of the system toward Buzzards Bay. This is caused, in part, by the fact that the modeled sediment transport for the large area south of the Hurricane Barrier is still in the process of coming into equilibrium with the specified initial bed conditions and the open boundary condition.

TABLE 2-3
NET FLUX OF SUSPENDED SEDIMENT AND
TOTAL PCBS IN KILOGRAMS PER TIDAL CYCLE

ESTUARY AND LOWER/HARBOR BAY
FEASIBILITY STUDY

	Computed	Teeter (1988)	EPA (1983b)
Total Suspended Sediment Flux	536	2,202	6,682
Total PCB Flux	-0.22	-1.55	-0.91

NOTE: Negative flux is out of the system toward Buzzards Bay.

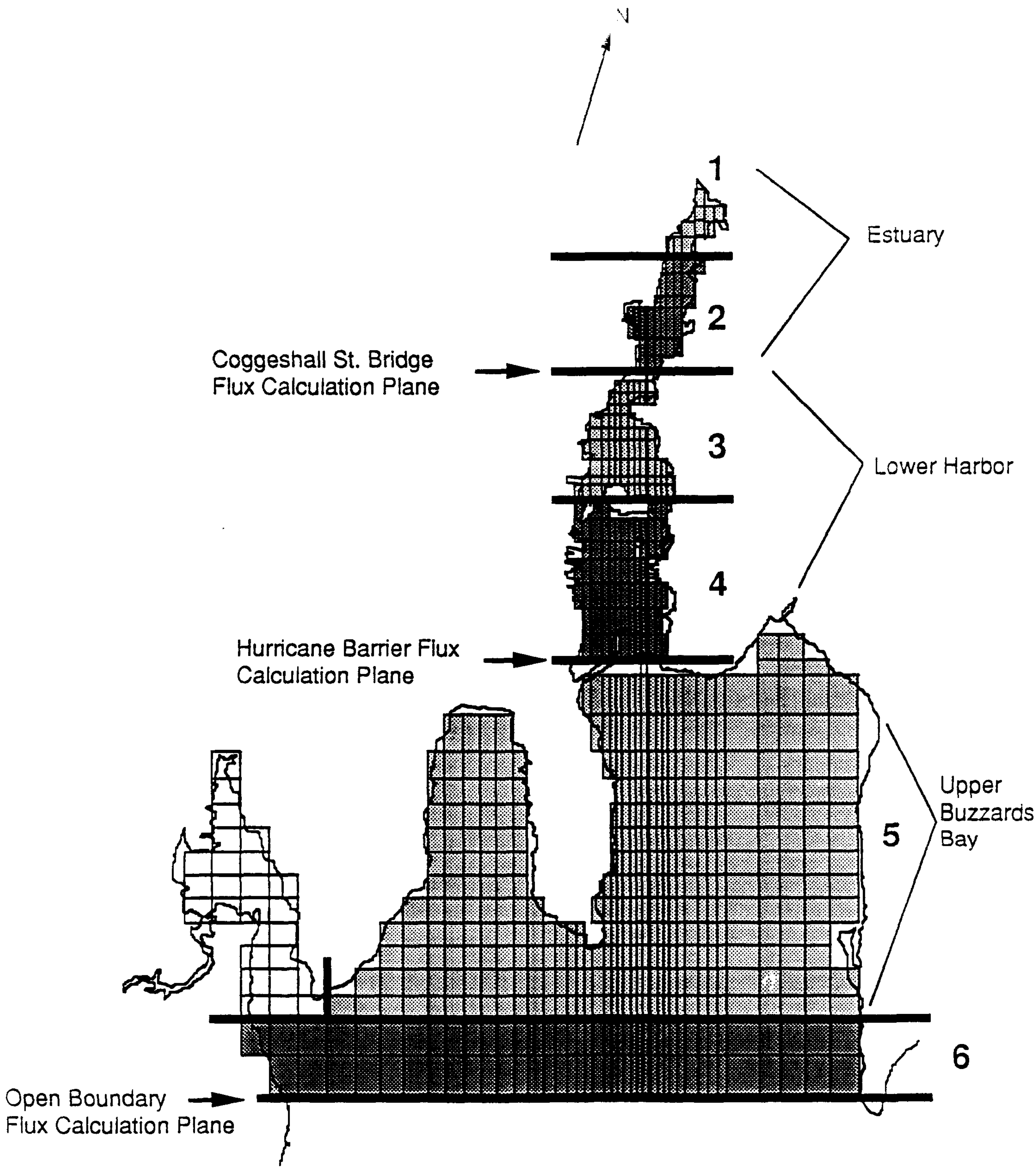


FIGURE 2-13
BOX AVERAGE ZONES AND FLUX CALCULATION PLANES
ESTUARY AND LOWER HARBOR AND
BAY FEASIBILITY STUDY
NEW BEDFORD HARBOR

4959-25

	Coggeshall St. Bridge	Hurricane Barrier	Open Boundary
Total Suspended Sediment Flux	446	1,546	-24,641
Total PCB Flux	-0.22	-0.15	-1.32

Table 2-4 : Net flux of suspended sediment and total PCBs (kg/tidal cycle) computed in the calibration simulation. Negative flux is out of the system towards Buzzards Bay.

Zones 1 & 2 Upper Estuary				
Sediments	**Initial Mass (kg)**	**Net Mass Flux (kg)**	**Final Mass (kg)**	**Mass Change (kg)**
Water Column Mass	2,945	+82,000	4,442	+1,497
Seabed Mass	49,720,000		49,800,000	+80,000
PCBs				
Water Column Mass	0.39	-40.0	2.88	-2.49
Seabed Mass	19,714		19,431	-283
Zones 3 & 4 Inner Harbor				
Sediments	**Initial Mass (kg)**	**Net Mass Flux (kg)**	**Final Mass (kg)**	**Mass Change (kg)**
Water Column Mass	32,398	+202,282	80,460	48,062
Seabed Mass	165,670,000		165,860,000	190,000
PCBs				
Water Column Mass	1.58	+13.42	2.62	+1.04
Seabed Mass	1,778		1,733	-45
Zones 5 & 6 Outer Harbor				
Sediments	**Initial Mass (kg)**	**Net Mass Flux (kg)**	**Final Mass (kg)**	**Mass Change (kg)**
Water Column Mass	333,300	-4,815,596	965,400	+632,100
Seabed Mass	1,402,300,000		1,398,800,000	-3,500,000
PCBs				
Water Column Mass	15.53	-215.5	5.15	-10.38
Seabed Mass	4,492		4,206	-286

Table 2-5 : Mass balance computed for the calibration simulation.

The computed net flux of PCBs through each plane is toward Buzzards Bay. PCBs are being transported out of the upper estuary through and into the inner harbor at a rate of 155 kilograms per year (kg/yr). Similarly, PCBs are transported through the Hurricane Barrier into Buzzards Bay at a rate of 105 kg/yr.

Table 2-5 presents a mass balance analysis of the computed results for the calibration simulation. As indicated by the net flux computations, the upper estuary is a depositional area for sediments. During the course of the 95-day calibration simulation, the upper estuary received an additional 82,000 kg of sediment. Although sediments with a lower sorbed PCB concentration were being transported and deposited into the upper estuary, the mass of PCBs within the sediments decreased only slightly. This indicated that PCB mass transfer from the bed to the water column, which is modeled as a desorption process, is more significant than mass transfer of PCBs absorbed to particles through erosion or deposition. The average concentration of PCBs in bed sediments was initially approximately 397 milligrams per kilogram (mg/kg). Had all the sediment that was added to the seabed been deposited with a zero PCB concentration and no PCB mass was lost due to desorption, the resulting average concentration would be 396 mg/kg. The actual final concentration was 390 mg/kg. Therefore, even under ideal conditions, deposition of cleaner sediments is not a significant transport process in the upper estuary.

Volatilization appears to be the most significant process occurring in the simulation of the upper estuary. The PCB volatilization rate used in the model was set to the mean of several literature values for similar water bodies (Bopp, 1983). A spatially uniform volatilization coefficient of 1.3×10^{-5} m/sec was used. Approximately 243 kg of PCBs, or 86 percent of the original 283 kg which migrates from the sediment into the overlying water column, is removed from the system in the 95-day simulation through volatilization.

The importance of volatilization is further evidenced by the mass balance calculations for the inner harbor area. This area receives a net influx of PCBs from the upper estuary, and a lesser amount of PCBs is transported out of the inner harbor through the Hurricane Barrier. However, the inner harbor still experienced a net PCB loss of 44 kg. Although sediment deposition is occurring in the inner harbor, as was the case in the upper estuary, this process is not a significant contribution to the transport of PCBs. The average concentration of PCBs within the bed sediments changes very little; the initial and final concentrations are 10.7 and 10.5 mg/kg, respectively.

In deeper waters outside the Hurricane Barrier in the outer harbor, volatilization accounts for only 81 kg of the PCB mass transport. PCB transport by sediment erosion only accounts for approximately 14 kg of the 286 kg lost from the bed. These estimates are based on the mass of sediment eroded from the bed and the average PCB concentration of 3.0 mg/kg. Again, mass transfer of PCBs from the seabed to the water column and subsequent transport in the water is the most significant process.

In summary, results of the TEMPEST/FLESCOT model simulation show that the transfer of PCBs from the bed to the water column through direct desorption and the subsequent volatilization of PCBs from the water column are the most important transfer processes. Volatilization in the shallow areas of the upper estuary is significant.

2.4.1.5 Other Transport Studies

Numerous studies have shown that the upper estuary and the inner harbor are depositional areas for sediment (Summerhayes et al., 1977; and Teeter, 1988). USACE field measurements of total suspended material (TSM) collected at the Coggeshall Street Bridge showed a net flux of TSM always landward or upstream. About one third of the sediment that enters the upper estuary on the flood tide settled out during that tidal cycle. Average net flux of TSM into the upper estuary was about 2,200 kg per tidal cycle (Teeter, 1988). This number is nearly five times higher than the 446-kg flux computed by the TEMPEST/FLESCOT simulations. One reason for the lack of agreement is that the field measurements were made under tide and wind conditions different than those used in the model simulation.

The natural deposition of "clean" sediment would not be expected to provide effective cover or to dilute the contaminated surface sediment. Teeter estimated that the net flux of 2,200 kg of TSM into the upper estuary would result in a sedimentation rate of 3 millimeters per year when spread over the entire surface area (approximately 800,000 square meters at mean tide) of the upper harbor at a bulk wet density of 1.5 grams per cubic cm (Teeter, 1988). However, actual sedimentation rates will vary widely over the upper estuary, depending on current, wave, and depth regimes (Teeter, 1988). Brown and Wagner examined sediment core samples from the upper estuary and found no consistent pattern of sedimentation between the 5- to 7.5-cm and the 15- to 17.5-cm depths (Brown and Wagner, 1986). Other reports identified PCB concentrations in the surface layers as equal to subsurface concentrations, despite cessation of PCB release, continued sedimentation, and PCB losses to the water column (Brown and Wagner, 1986).

Measured concentrations of PCBs in the water in New Bedford Harbor provide evidence that the sediment is a substantial source of PCBs to the overlying water column. Average PCB concentrations in the water column range from 326 to 5,889 nanograms per liter (ng/L) in the estuary (EPA, 1983b; Battelle, 1985; and Applied Science Associates, Inc., 1989); 174 to 322 ng/L in the lower harbor (Battelle, 1985); and 31 to 95 ng/L in the bay (Battelle, 1985). These measurements show a PCB concentration gradient that decreases with increasing distance from the estuary.

The continuous release of PCBs in the presence of ongoing general deposition suggests that PCBs are able to migrate vertically to the surface of the sediment bed, through the sediment-water interface, and into the water column. Numerous transport mechanisms have been investigated or proposed, including adsorption/desorption (Brownawell, 1986), bioturbation (Thibodeaux, 1989), and particle exchange (Teeter, 1988). Brownawell investigated the sorption of PCBs with colloidal organic material in seawater and the influence of this process on the distribution of PCBs in coastal sediments. The interstitial waters from the organic-rich sediment from New Bedford Harbor contain high concentrations of colloidal organic matter. Elevated PCB concentrations found in the interstitial waters (compared to water column concentrations) provided evidence that the PCBs were in a dynamic equilibrium with the colloidal and sediment organic matter. Brownawell concluded that the mobility of this colloidal-sorbed PCB phase could provide an important source of flux of PCBs across the sediment-water interface to the water column (Brownawell, 1986). Thibodeaux suggested that the dominant PCB transport mechanism from the sediment to the water column is via bioturbation (Thibodeaux, 1989). This process refers to the activities of animals (e.g., burrowing, ingestion/defecation, tube-building, and biodeposition) residing primarily in the top 3 to 10 cm of sediment, which cause a net physical vertical and horizontal movement of sediment particles and pore water.

Teeter evaluated particle exchange as a mechanism of transporting PCBs from contaminated bed sediment (Teeter, 1988). This process in known to operate in fine, cohesive sediment and suspensions similar to those found in the upper estuary. Teeter's analysis proposes that PCBs attached to the sediment particles at the surface of the bed in New Bedford Harbor could be exchanged into the overlying sediment suspended in the water column, along with sediment particles by a physical particle exchange mechanism. The net vertical transport of contaminant resulting from particle exchange would be in the direction of reduced concentrations. The flux of particle-associated contaminants depends on the mass rate of particle exchange between bed sediment and suspension, and on the difference in contaminant concentration between bed and suspended particles.

The flux of PCBs from the sediment in the upper estuary to the water column was computed to be 1,123 kg/yr during the

TEMPEST/FLESCOT model simulation (Battelle, 1990). This estimate compares favorably with other studies. Based on the results of three chemodynamic models correlating PCB water column concentrations and sediment flux, Thibodeaux estimated the total flux of PCBs leaving estuary sediment to range from 500 to 6,000 kg/yr (Thibodeaux, 1989). Applied Science Associates, Inc. (ASA) estimated a PCB flux of 1,700 kg/yr from the upper estuary sediments (ASA, 1989).

The TEMPEST/FLESCOT model computed a net seaward flux of 155 and 105 kg/yr of PCBs at the Coggeshall Street Bridge and the Hurricane Barrier, respectively. Measured concentrations of PCBs in the water of the upper estuary correlated with tidal cycles confirm the transport of PCBs out of the estuary (Teeter, 1988). Total PCB concentrations in the water column ranged from 1,300 to 5,800 ng/L on the ebb tide, and 500 to 3,000 ng/L on the flood tide. Based on these measurements, Teeter calculated a seaward PCB flux ranging from 49.3 to 1,663.8 kg/yr, with a mean of 1,092 kg/yr (Teeter, 1988). Similar studies have estimated seaward PCB flux in this range (EPA, 1983b; and ASA, 1989).

Tidal pumping was determined to be the dominant transport mechanism for landward flux of suspended sediment and seaward flux of PCBs. Teeter evaluated three important estuarine transport processes for suspended material: transport by net flow, vertical circulation, and tidal pumping (Teeter, 1989). He concluded that tidal pumping was the most dominant transport process. ASA conducted a continuous dye-release study simulating the release of PCBs in the water column of the estuary (ASA, 1987). This study confirmed tidal flushing through the Hurricane Barrier. The flushing time for the estuary was estimated at 2.4 days (ASA, 1987).

Results of the TEMPEST/FLESCOT model simulation indicated that volatilization of PCBs from the water column was a significant transport mechanism. This finding is supported by other studies. Thibodeaux calculated that at least 41 percent of the PCBs entering the water column from the estuary sediment evaporates into the air; the remaining 59 percent is transported seaward through the Coggeshall Street Bridge (Thibodeaux, 1989). Thibodeaux's calculations were based on a volatilization coefficient of 1.68 meters per day (m/day) (1.95×10^{-5} m/sec). ASA used a volatilization coefficient of 2.37 m/day obtained from Lyman, and calculated a PCB evaporative loss of 50 percent (ASA, 1989; and Lyman et al., 1982).

2.4.1.6 Long-term Transport

An estimation of the long-term transport and fate of PCBs in the New Bedford Harbor system in the absence of remedial action was simulated for a 10-year future period using the TEMPEST/FLESCOT model. This simulation case was run in the same manner as the 95-day model calibration described previously. The no-action scenario described below assumes prior removal of the Hot Spot area. Remediation of the Hot Spot area as the first operable unit was discussed earlier in Section 1.0.

Each 95-day sediment-contaminant calibration simulation consumed about 5 hours of CPU time on a Cray XMP supercomputer. Because the computer costs to generate a continuous 10-year simulation are prohibitive, the no-action scenario was done using the following method. For each five-stage, 95-day series, the rate of mass change in each bed cell was computed. Using this rate of change, the mass in each bed cell was linearly extrapolated forward using a two-year time step. The extrapolated bed conditions defined a new initial bed condition for the next 92-day simulation. The steps were repeated until the tenth year was reached. The model parameters and open boundary conditions were held constant in each step. Using this scheme, simulations for Years Zero, 2, 4, 6, 8, and 10 were computed.

To facilitate interpretation of the simulation results, the computed values in each grid cell were averaged for each of the six zones identified in Figure 2-13.

Details on the results of the 10-year no-action simulation are presented elsewhere (Battelle, 1990). In general, the results show steady declines in sediment bed and water column PCB concentrations throughout the New Bedford Harbor system. By the end of the 10-year simulation, PCB mass in the sediment has been reduced by approximately 23 percent in the upper estuary (Zones 1 and 2); 13 percent in the lower harbor (Zones 3 and 4); and 48 percent in upper Buzzards Bay (outer harbor Zones 5 and 6). Average water column PCB concentration decreased by approximately a factor of 2 in the upper estuary, 1.7 in the lower harbor, and 2.5 in the outer harbor.

The computed net flux of total suspended sediment and total PCBs for Year Zero and Year 10 of the no-action simulation is summarized in Table 2-6. Results for the interim two-year periods are presented elsewhere (Battelle, 1990). Suspended sediments are transported into the lower harbor and upper estuary throughout the long-term simulation. Initially, sediments are transported out of the system through the open boundary; however, by Year 4, the flux direction has reversed because the model has reached an equilibrium condition between sediments eroded and/or deposited from the seabed and those transported through the open boundary.

	YEAR 0			YEAR 10		
	Coggeshall St. Bridge	Hurricane Barrier	Open Boundary	Coggeshall St. Bridge	Hurricane Barrier	Open Boundary
Total Suspended Sediment Flux	446	1,545	-24,641	282	2,120	24,856
Total PCB Flux	-0.21	-0.14	-1.32	-0.18	-0.10	-0.29

Table 2-6 : Computed net flux of suspended sediment and total PCBs in kg/tidal cycle for Year 0 and and Year 10 for the No Action simulation (excluding the Hot Spot). Negative flux is out of the system towards Buzzards Bay.

Zones 1 & 2 Upper Estuary			
Sediments	**Year 0 Mass (kg)**	**Year 10 Mass (kg)**	**Mass Change (kg)**
Water Column Mass	4,442	3,101	-1,341
Seabed Mass	49,800,000	52,330,000	2,530,000
PCBs			
Water Column Mass	2.3	1.2	-1.1
Seabed Mass	13,530	10,450	--3,080
Zones 3 & 4 Inner Harbor			
Sediments	**Year 0 Mass (kg)**	**Year 10 Mass (kg)**	**Mass Change (kg)**
Water Column Mass	80,460	59,450	-21,010
Seabed Mass	165,800,000	179,400,000	13,600,000
PCBs			
Water Column Mass	2.6	1.5	-1.1
Seabed Mass	1,732	1,498	-234
Zones 5 & 6 Outer Harbor			
Sediments	**Year 0 Mass (kg)**	**Year 10 Mass (kg)**	**Mass Change (kg)**
Water Column Mass	965,400	851,100	-114,300
Seabed Mass	1,523,000,000	1,627,000,000	104,000,000
PCBs			
Water Column Mass	5.3	2.1	-3.2
Seabed Mass	4,674	2,407	-2,267

Table 2-7: Computed Mass Balance for 10 Year No Action Simulation (excluding the Hot Spot).

The flux of PCBs is out of the system toward Buzzards Bay throughout the 10-year simulation. Flux of PCBs through the Coggeshall Street Bridge and the Hurricane Barrier remains approximately the same, while the flux through the open boundary decreased in response to the decrease in concentration of PCBs in the bed sediments outside the Hurricane Barrier. This suggests that the initial concentration of PCBs in the sediment outside the Hurricane Barrier may have been biased toward higher levels because the field data were collected mainly from areas of suspected contamination and therefore not randomly.

Table 2-7 shows the computed mass balance for the sediment and the water column over the important geographic areas for the 10-year no-action simulation. As noted earlier, the upper estuary and lower harbor are depositional zones for sediments. The average concentration in the upper-estuary bed layer has decreased from 272 mg/kg to 200 mg/kg by Year 10. Average water column PCB concentrations in the upper estuary decreased from 1,634 mg/L in Year Zero to 850 mg/L in Year 10. Volatilization is a major transport process for PCBs in the upper estuary. Using the average of the Year Zero and Year 10 net flux rates given in Table 2-6 and assuming the flux to remain constant over the 10-year period yields a mass loss of 1,373 kg, or 137 kg per year, from the upper estuary through net flux, while the mass lost from the bed layer is 3,080 kg (Table 2-7), or 308 kg per year. Therefore, approximately 1,707 kg, or 171 kg per year, left the system through volatilization. The lower harbor and the outer harbor show similar trends of sediment deposition and declining PCB concentrations (Battelle, 1990).

2.4.1.7 Summary of the TEMPEST/FLESCOT Model Results

Overall results of the TEMPEST/FLESCOT model simulation and other transport studies confirm that significant transport of sediment and PCBs is occurring in the New Bedford Harbor system. Although there is a net landward flux of suspended sediments, deposition of "clean" sediment in the lower harbor and estuary would not be expected to provide a sufficient cover to cap or isolate PCBs from the water column, nor would sediment deposition sufficiently dilute the contaminated sediment.

PCBs in the sediment are continuously migrating into the overlying water column. Measurements of sediment and water column PCBs indicate a large concentration gradient from the estuary to the lower harbor, with the highest concentrations in the estuary. Tidal pumping and dispersion is the dominant transport mechanism for a net seaward flux of PCBs from the estuary into the lower harbor and through the Hurricane Barrier into Buzzards Bay. However, volatilization of PCBs from the water is also a major transport mechanism, accounting for perhaps as much as 50 percent of the loss of PCBs from the water column.

Long-term simulations of PCB transport indicate that 23 and 13 percent reductions in sediment PCB mass would occur in the estuary and lower harbor areas, respectively, while a 48 percent reduction in PCB mass would be achieved in the outer harbor area over a 10-year period. However, average bed sediment and water column concentrations in the upper estuary at the end of the 10-year period would still remain relatively high at 200 mg/kg and 850 mg/L, respectively.

Results of the TEMPEST/FLESCOT model simulations are based on initial conditions residing in the 4-cm surficial sediment layer. The sediment PCB concentrations assigned to this surficial layer do not represent the actual PCB concentrations which, in many areas of the estuary and lower harbor/bay, are much higher. The TEMPEST/FLESCOT simulations provide a projection of relative rather than absolute trends; therefore, the simulation results are useful for comparative purposes.

2.4.2 Fate of Polychlorinated Biphenyls

Section 2.3.1 discussed the major mechanisms for PCB transport in New Bedford Harbor: adsorption/desorption of PCBs between sediment and water and subsequent tidal pumping/dispersion and volatilization of dissolved PCBs from the water column. These mechanisms would reduce the mass of PCBs within a given geographic area (e.g., the estuary) through redistribution to another area (tidal pumping to the lower harbor/bay) and/or through transport to another media (volatilization to the atmosphere).

The ultimate fate of PCBs that remain within New Bedford Harbor is controlled by naturally occurring physical and chemical processes such as hydrolysis, photolysis, biodegradation, and bioaccumulation. Hydrolysis and photolysis are both recognized as attenuative processes for PCBs. However, because of the relatively slow rates at which these processes occur, a significant reduction in sediment PCB mass is not expected in a timely manner.

Natural biodegradation of the PCBs in New Bedford Harbor sediments has been investigated as an attenuative mechanism. Natural (or in situ) biodegradation is a process by which contaminants are degraded by indigenous micro-organisms without removing the contaminated medium from its location. The micro-organisms may operate in either an aerobic (oxygen) or anaerobic (oxygen-free) environment.

Recent studies conducted by General Electric Corporation on Hudson River sediment suggest that selective, reductive dechlorination of PCB congeners is occurring slowly via anaerobic microorganisms (Brown and Wagner, 1986). However, the bacterial strains capable of degrading the heavily chlorinated PCB congeners have not been isolated. Researchers at the EPA Gulf Breeze Laboratory reviewed Brown's work and found his conclusions for anaerobic degradation of PCBs in sediment to be reasonable explanations of the data (EPA, 1988).

There is evidence to suggest that anaerobic degradation of PCBs is occurring in New Bedford Harbor sediment. Studies conducted by the EPA-Environmental Research Laboratory (ERL) in Narragansett, Rhode Island, on sediment cores collected from the pilot dredging study area (with PCB concentrations in the 100-ppm range) suggested that anaerobic dechlorination of PCBs is not a significant process at this location (Pruell, 1988). However, ongoing studies conducted by EPA-ERL on estuary sediment samples with PCB concentrations of 500 ppm and higher suggested that significant reductive dechlorination of highly chlorinated PCB congeners was occurring in a manner consistent with Brown's data supporting anaerobic processes (Pruell, 1988).

These findings suggest that anaerobic degradation of sediment PCBs may be occurring more readily in highly contaminated sediment (i.e., greater than 500 ppm); however, little or no anaerobic degradation is occurring in sediment with low PCB concentrations (i.e., less than 500 ppm). Research conducted by Brown and Wagner focused on the comparison of congener composition in commercial PCB products (e.g., Aroclors) with the congener distributions in New Bedford Harbor sediment as a means of supporting their contention for anaerobic degradation (Brown and Wagner, 1986). Depletion and shifts in congener distributions can also result from various physical and chemical processes, such as differential adsorption, volatilization, hydrolysis, and photo-oxidation.

Although biodegradation of PCBs in New Bedford Harbor sediment appears to be occurring, the studies conducted to date have not provided sufficient data for a reliable estimation of biochemical decay rates or half-lives, as well as the toxicity of the decay products. More information is needed to evaluate the length of time that would be required for removal of PCBs from New Bedford Harbor sediment by natural biological processes. Brown suggested that the half-life of anaerobic degradation of heavily chlorinated PCBs may range from seven to 50 years (Brown and Wagner, 1986). Based on this estimate, the time required for biodegradation to reduce a sediment PCB concentration of 4,000 ppm to 50 ppm (i.e., the TSCA limit) would be approximately 50 to 350 years.

In summary, naturally occurring physical and chemical fate processes such as hydrolyis, photolysis, and biodegradation would not be expected to significantly reduce sediment PCB mass in a timely manner, particularly when compared with tidal pumping and dispersion, and volatilization. Sediment and water column PCB concentrations, particularly in the upper estuary, would remain relatively high for the foreseeable future.

Bioaccumulation or uptake of PCBs by aquatic biota is a fate process of significant importance because of the adverse impacts to biota, human health impacts associated with ingestion of contaminated biota, and economic impacts on the local fishing industry.

Sustained elevated concentrations of PCBs in lobster and several other species have been documented in fishing closure Area 3 (see Figure 1-2). Monitoring conducted from 1977 to 1987 indicates mean PCB concentrations in lobsters have remained relatively constant, exceeding the 2-ppm FDA tolerance level. The mean PCB concentration was 3.9 ppm in 1977 (Kolek and Ceurvels, 1981); 4.2 ppm in 1985 (Massachusetts Division of Marine Fisheries, unpublished data); and 5 ppm in lobsters collected during 1987 (Pruell et al., 1988). PCB concentrations exceeding the 2-ppm tolerance level were also observed in winter flounder (Pruell et al., 1988). PCB levels in lobsters appear to have remained relatively constant over the past decade.

The concentration of a toxic substance in an aquatic animal is the result of several uptake and loss processes, including transfer across the gills, surface sorption, ingestion of contaminated food, desorption, metabolism, excretion, and growth. These processes are controlled by the bioenergetics of the animal, and the chemical and physical characteristics of the toxic substance (Battelle, 1990).

As part of the New Bedford Harbor FS program, a food chain computer model was developed and applied to New Bedford Harbor. The objective of this modeling program was to determine the concentrations of PCBs and metals in aquatic biota as a result of exposure to contaminated sediment and water. Contaminant concentrations in animals were computed with respect to time, location, and life-stage.

Detailed descriptions of the model, model formulation used for New Bedford Harbor, and model calibration are presented in a comprehensive report documenting the modeling program (Battelle, 1990). An overview of the food chain model as it relates to an understanding of the results discussed in this FS is presented in the following subsections.

2.4.2.1 The WASTOX Model

The numerical model used in this study was the FORTRAN code WASTOX (Connolly and Thomann, 1985). This model determines concentrations in aquatic animals by solving a differential equation describing the change in concentration in an animal by uptake of a chemical from water passing over its gills, contaminated food in its gut, and losing chemicals through excretion to the water. This differential equation must be solved simultaneously for each animal being modeled. A general mass balance for whole-body burden is derived by combining uptake and loss rates of the chemical contaminant. Uptake of the chemical due to ingestion of contaminated food considers the chemical concentration in the food, rate of food consumption, and the degree to which the ingested chemical in the food is actually assimilated into the tissues. Uptake of the chemical from water is determined by the rate of transfer of the chemical across the gills. The rate of loss of the chemical from the animal is the sum of the excretion and detoxification or degradation rates of the chemical. Specific bioenergetic- and chemical-related parameters are required as input for each species in the model. Bioenergetic-related parameters include growth rate, respiration rate, assimilation efficiency, and predator/prey relationships. Chemical-related parameters include assimilation efficiency of the chemical in the food, molecular diffusivity of the chemical, and the bioconcentration factor (BCF) or whole-body excretion rate. The variation of these parameters with age and the feeding habits of each species modeled must also be known.

2.4.2.2 WASTOX Formulation for New Bedford Harbor

The WASTOX model was applied to New Bedford Harbor and portions of adjoining Buzzards Bay. This area was divided into four compartments designated Areas 1 through 4. Figure 2-14 shows the segmentation of the study area. Two food chains were incorporated into the WASTOX model for New Bedford Harbor: the lobster (Homarius americanus) and the winter flounder (Pseudopleuronectes americanus). Both species are indigenous to the area. The lobster is the top predator in a three-level food chain represented by crabs, mussels, polychaetes, phytoplankton, and sediment detrital organic material. Figure 2-15 shows a diagram of the lobster food chain with the fraction of total food consumption assigned to each species. The winter flounder is an omnivore that eats whatever is available, including clams, juvenile crabs, polychaetes and other benthic invertebrates, and phytoplankton. Figure 2-16 is a diagram of the winter flounder food chain with the fraction of total food consumption assigned to each prey. Details on the selection of food chain species and diet distribution, assimilation efficiencies and bioconcentration factors are presented elsewhere (Battelle, 1990).

2.4.2.3 Calibration of the WASTOX Model

The food chain model for New Bedford Harbor was calibrated for PCB Homologs 3, 4, 5, and 6 and for total PCBs (expressed as the sum of Homologs 2 through 9). Arithmetic-averaged dissolved and

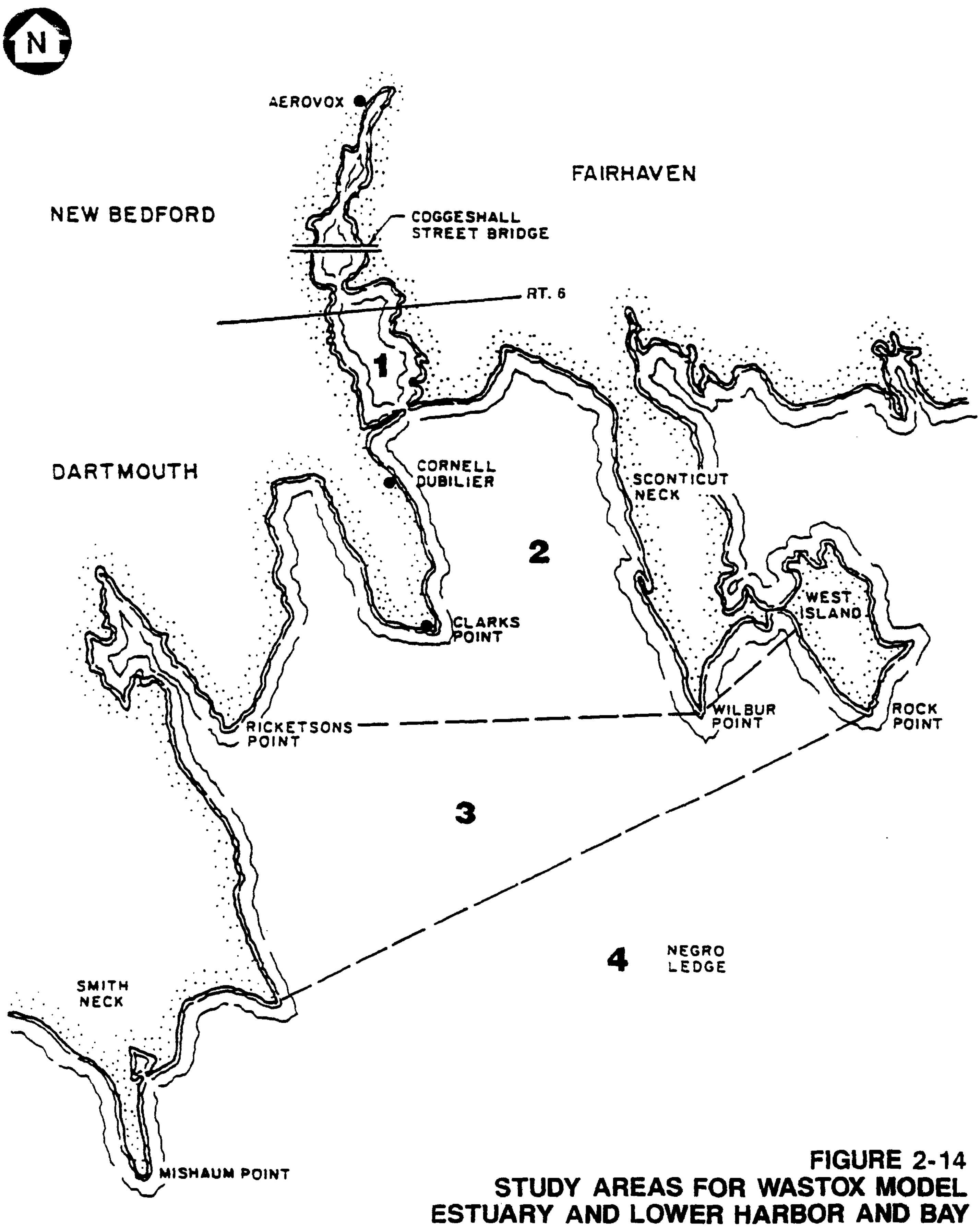


FIGURE 2-14
STUDY AREAS FOR WASTOX MODEL
ESTUARY AND LOWER HARBOR AND BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR

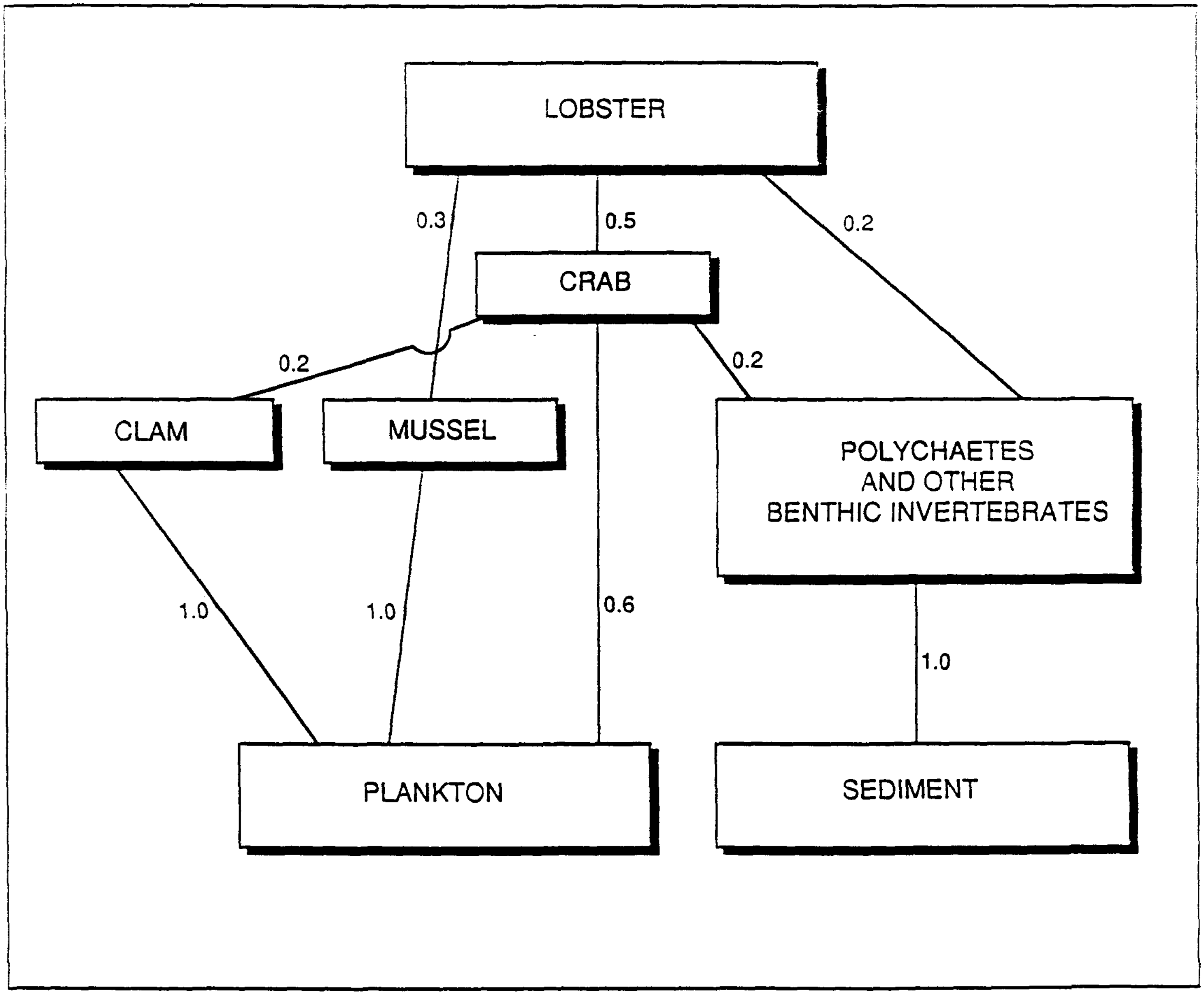


FIGURE 2-15
WASTOX MODEL LOBSTER FOOD CHAIN
ESTUARY AND LOWER HARBOR AND BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR

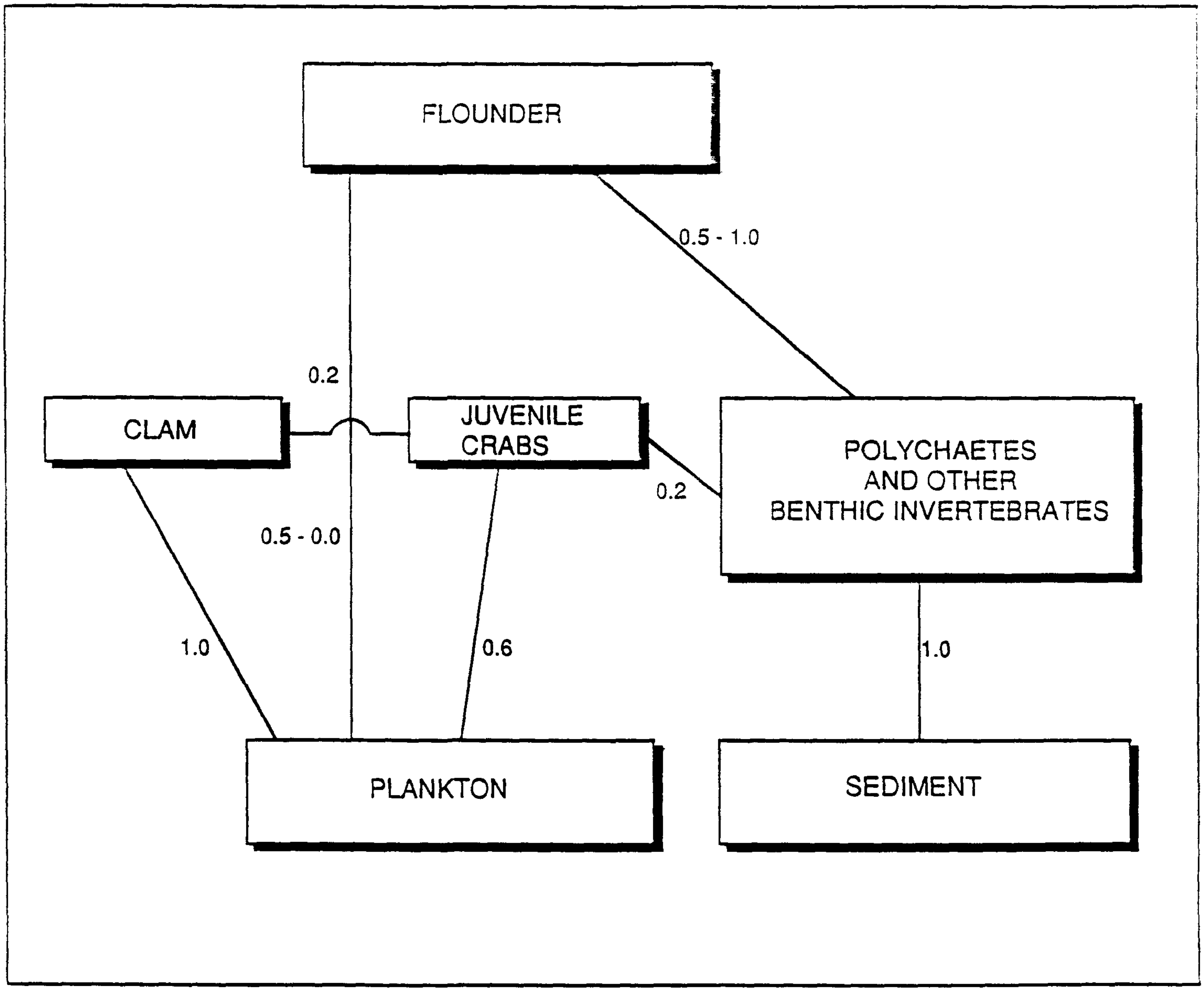


FIGURE 2-16
WASTOX MODEL FLOUNDER FOOD CHAIN
ESTUARY AND LOWER HARBOR AND BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR

particulate water column and sediment PCB concentrations from the Battelle field sampling cruises in 1984 and 1985 were used as exposure concentrations in calibrating the model. Arithmetic-averaged biota PCB concentrations derived from the same Battelle field sampling program were used in comparing the observed and computed concentrations of PCBs in the animals.

Six age classes of flounder and lobster were included in the model based on the weights of the animals collected during the trawls. The largest flounder age class included animals weighing up to 363 grams and the largest lobster age class included animals weighing up to 773 grams. Lobsters were not modeled in Area 1. No biota sampling was conducted north of Pope Island (Rt. 6 in Figure 2-12).

The averages of the computed flounder and lobster concentrations for all ages classes were weighted so that the contribution of any age class to the average was consistent with the contribution of that age class to the average of the observed values. For all other species in the food chain, the steady-state computed concentration was compared to the arithmetic average observed concentration.

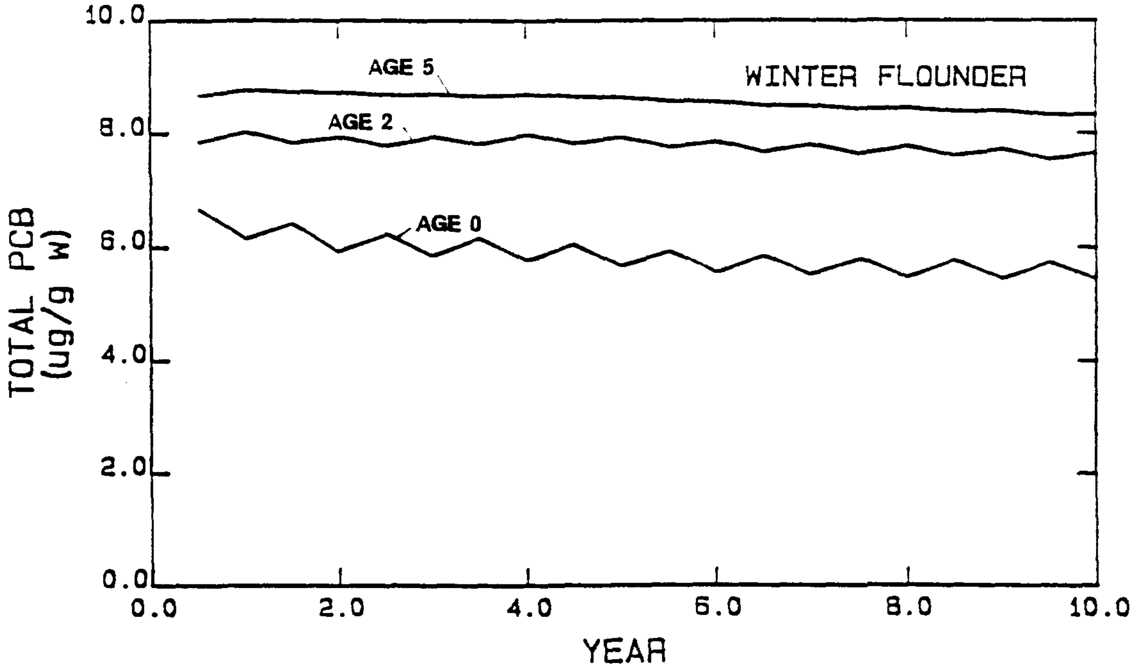
In general, there was good agreement between the observed data and the calculated concentrations for the homologs and total PCBs. The model successfully reproduced the variation in body burdens across the homologs and over the entire food chain. It also reproduced the spatial concentration gradients evident in the data, although some bias is evident in Areas 3 and 4 (Battelle, 1990).

2.4.2.4 Long-term Projections of the WASTOX Model

A 10-year projection of the effects of water column and sediment PCB concentrations on biota within the New Bedford Harbor system was evaluated. Water column and sediment PCB concentrations computed during the 10-year no-action (excluding the Hot Spot) TEMPEST/FLESCOT simulation were used as input conditions to the WASTOX model. Details on the interfacing of the two models are presented elsewhere (Battelle, 1990). The following discussion focuses on the flounder and lobster.

Projected concentrations in each age class of winter flounder and lobster relative to time are presented in Figures 2-17 through 2-19. In Area 1 (see Figure 2-17), the PCB concentration in flounder remains constant, ranging from approximately 6.0 micrograms per gram (ug/g) in Age Class 1 (ages 0 to 1 years) to approximately 9 ug/g in Age Class 6 (ages 5 to 6 years). No projection is made for lobster because the calibration did not include lobster within the inner harbor. The response of the flounder reflects the direct tie to the sediment through consumption of sediment-dwelling organisms (i.e., the polychaete). The flounder is obtaining almost all of the PCBs through ingestion; therefore, it is insensitive to the

NO ACTION ALTERNATIVE: AREA 1



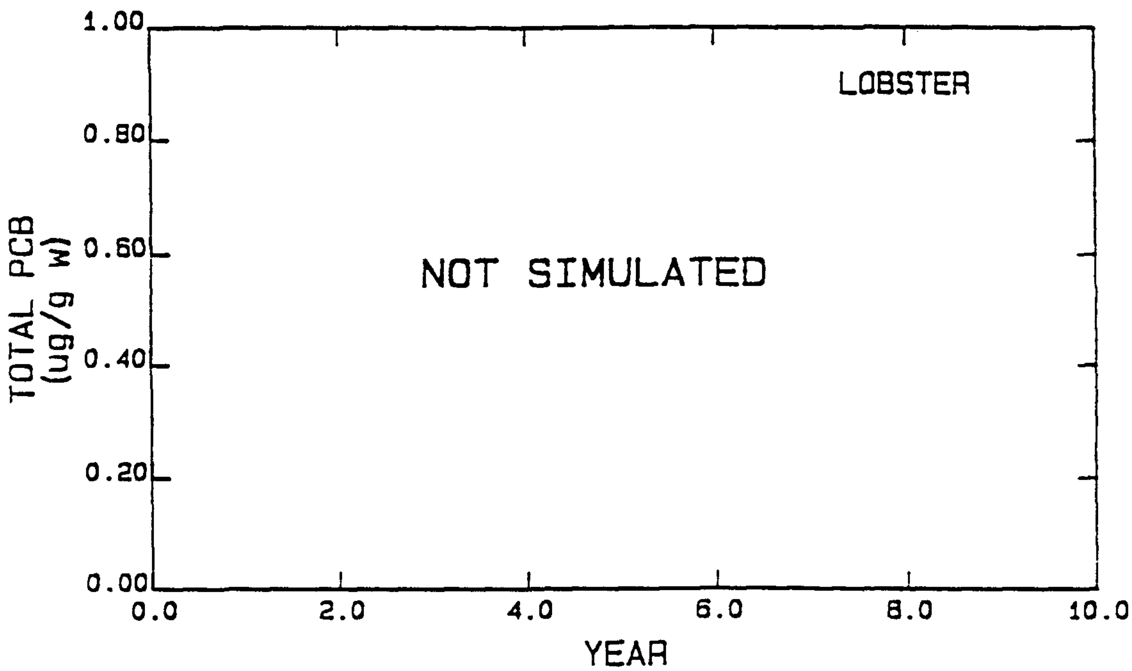


FIGURE 2-17
NO-ACTION ALTERNATIVE: AREA 1
ESTUARY AND LOWER HARBOR AND BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR

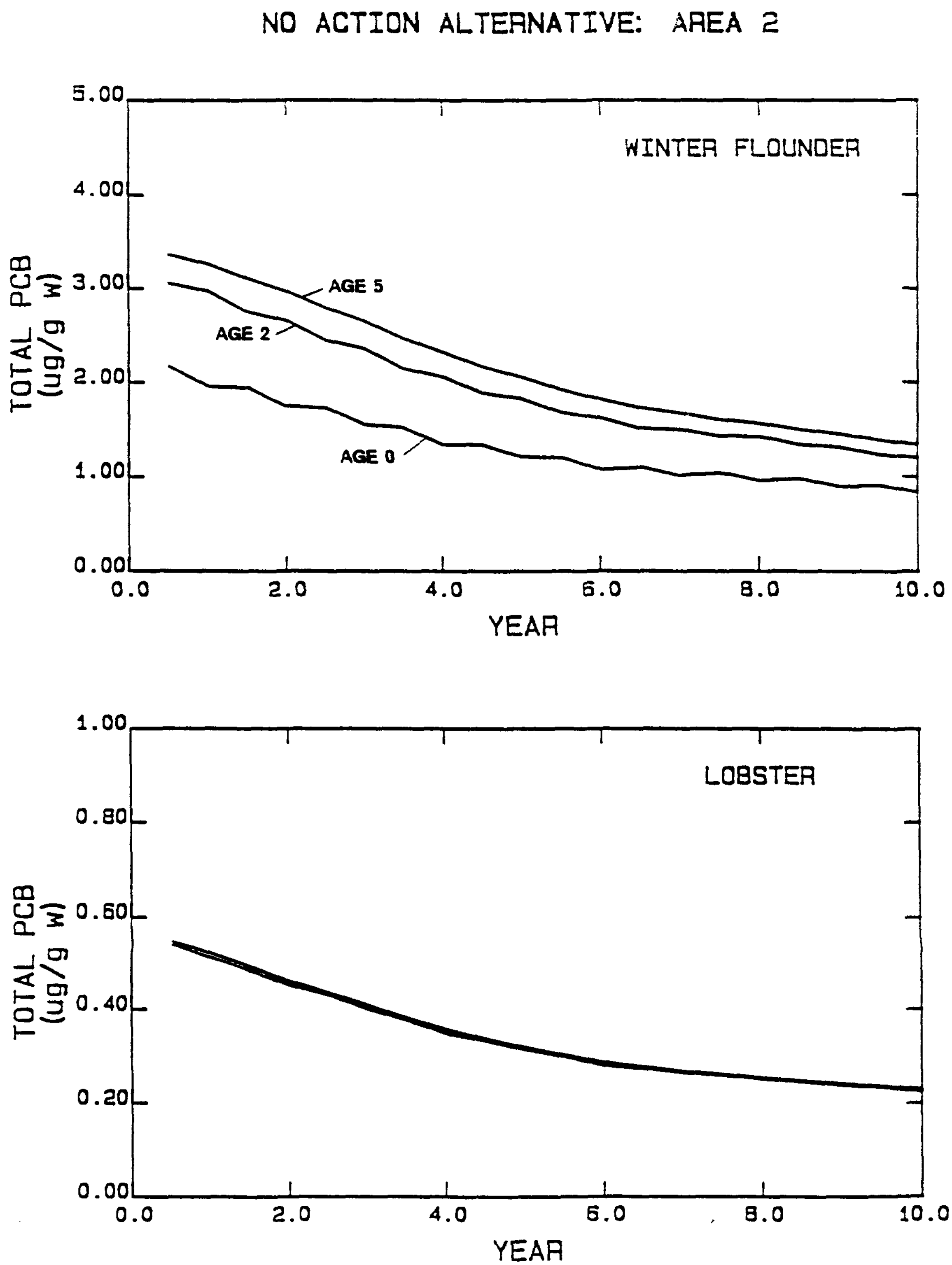


FIGURE 2-18
NO-ACTION ALTERNATIVE: AREA 2
ESTUARY AND LOWER HARBOR AND BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR

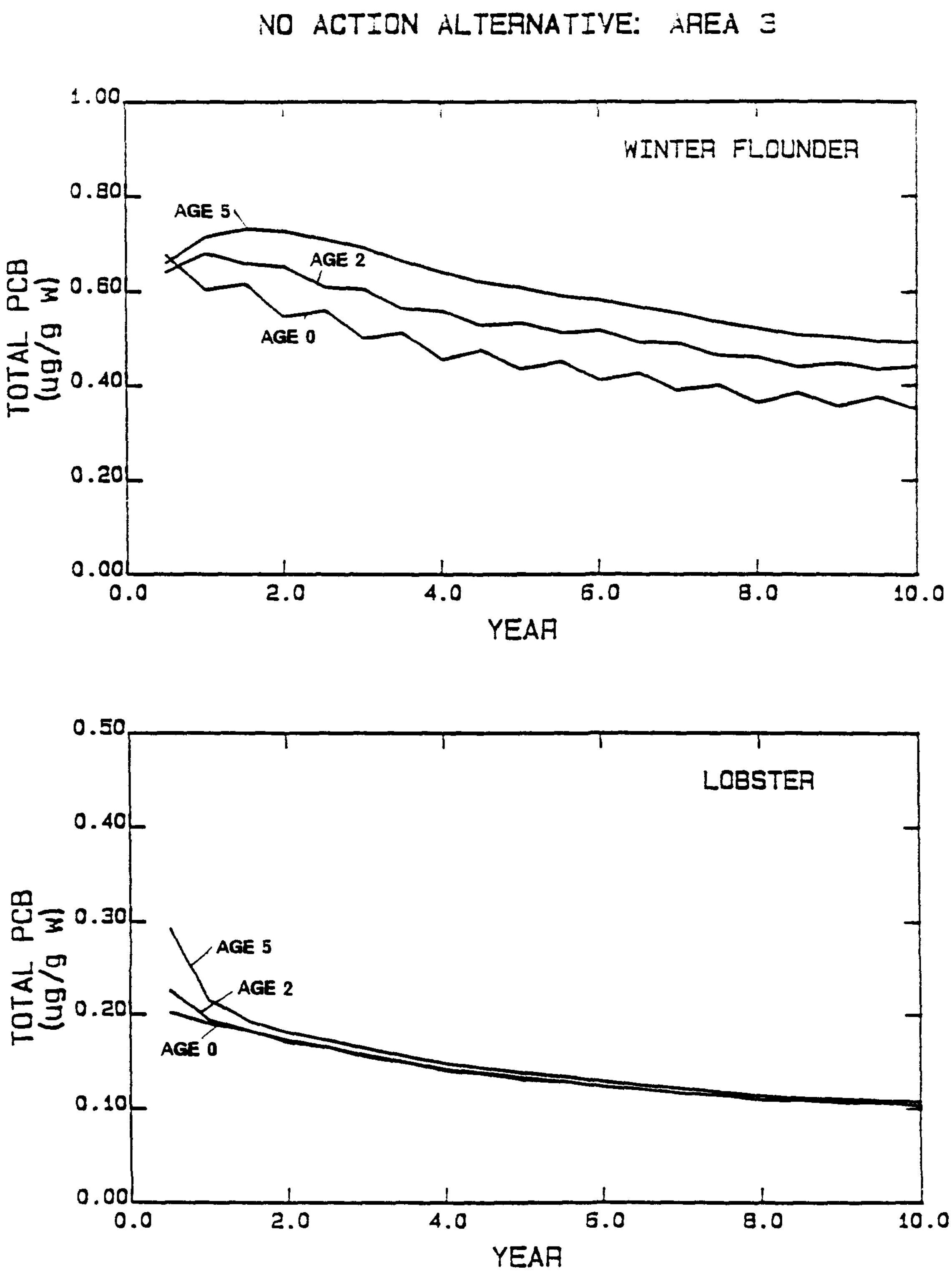


FIGURE 2-19
NO-ACTION ALTERNATIVE: AREA 3
ESTUARY AND LOWER HARBOR AND BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR

30 percent drop in water column PCBs occurring over the 10-year projection. The edible-to-whole-body-PCB ratio of 0.18 for flounder translates the FDA action limit of 2 ug/g edible to 11 ug/g whole body. Therefore, older flounder in Area 1 (Age Classes 3 through 6) are projected to remain close to the action limit (Battelle, 1990).

In Area 2 (see Figure 2-18), a significant drop in concentration occurs in both flounder and lobster. At the end of the 10-year period, concentrations have declined about 60 percent, consistent with declines in the water column and sediment (Battelle, 1990).

Flounder in this area are well below the FDA action limit, even at the start of the projection. The whole-body equivalent of the FDA limit for lobster is 0.22 ug/g. At the start of the projection, lobster are at a concentration about three times the action limit. After 10 years, they have reached levels very near the action limit. The variation in concentration with age class is much less for the lobster than for the flounder. Furthermore, all the age classes group near the action limit. This difference between the species reflects differences in bioenergetics (Battelle, 1990).

2.4.2.5 Summary of the WASTOX Model Results

Results of the WASTOX Model long-term simulation indicate that PCB concentrations in flounder and lobster will decline in response to declines in the exposure concentrations of PCBs in the water column and the sediment (projected by the TEMPEST/FLESCOTT model). However, the decline in biota concentrations will lag the water and sediment due to the relatively slow rates of depuration of accumulated PCBs. In addition, the extent of the decline in flounder and lobster will be dependent on the relative contribution of water column and sediment PCB to their body burdens since these sources of PCBs decline at different rates.

Ten-year projections of the WASTOX model for the no-action scenario show that PCB concentrations in older flounder (age Classes 3 through 6) residing in Area 1 (lower harbor) would remain close to the FDA Tolerance Level of 2 ug/g edible tissue (11 ug/g whole body). PCB concentrations in flounder residing in Area 2 (upper Buzzards Bay area) are below the FDA Tolerance Level even at the start of the ten-year projections. At the end of the ten-year period, concentrations would decline about 60 percent, consistent with the water column and sediment declines.

Ten-year projections of PCB concentrations in lobster residing in Area 1 were not, hence, no calibration for lobsters in Area 1 was made in the WASTOX model. Lobsters residing in Area 2 have PCB concentrations about three times the FDA Tolerance Level. After the ten-year projections, they would reach levels very near the FDA Tolerance Level.

3.0 SUMMARY OF BASELINE HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT

As part of the New Bedford Harbor Superfund FS, baseline risk assessments were conducted to identify the human health and environmental risks associated with contaminant exposure within the New Bedford Harbor site area. The draft final baseline human health risk assessment was released in August 1989, and the baseline ecological risk assessment will be released in the summer of 1990.

The New Bedford Harbor site area was divided into three areas to assess the potential for contaminant exposure and subsequent human health and ecological risks. These areas, shown in Figure 3-1, were defined as follows:

- Area I: The area between the Wood Street and Coggeshall Street bridges
- Area II: The area between the Hurricane Barrier and the Coggeshall Street Bridge
- Area III: The area south of the Hurricane Barrier

For the assessment of risks associated with fish consumption, fish sampling data from beyond Area III were also included. All of Areas II and III are contained within the study area defined as the lower harbor/bay.

The human health and ecological risk assessments are based on current conditions and serve as the basis for evaluating the various remedial alternatives. The baseline risk assessments are summarized in the following subsections.

3.1 SUMMARY OF BASELINE HUMAN HEALTH RISK ASSESSMENT

The purpose of the baseline human health risk assessment was to estimate risks to human health under current conditions due to exposure to PCBs and metals detected in the sediment, surface water, and biota within the New Bedford Harbor site. PCBs, cadmium, copper, and lead were all found in sediment at elevated levels compared to data gathered in uncontaminated areas. These contaminants were the focus of the quantitative risk evaluation. The risk assessment is based on existing site conditions and does not consider potential natural decrease in contaminant concentrations due to transport and degradation through time (see Section 2.0).

Data on the distribution of PCBs and metals in the study area were provided by Battelle Pacific Northwest Laboratories (PNL). The human health risk assessment was based primarily on a data set developed as the initial conditions, established by PNL,

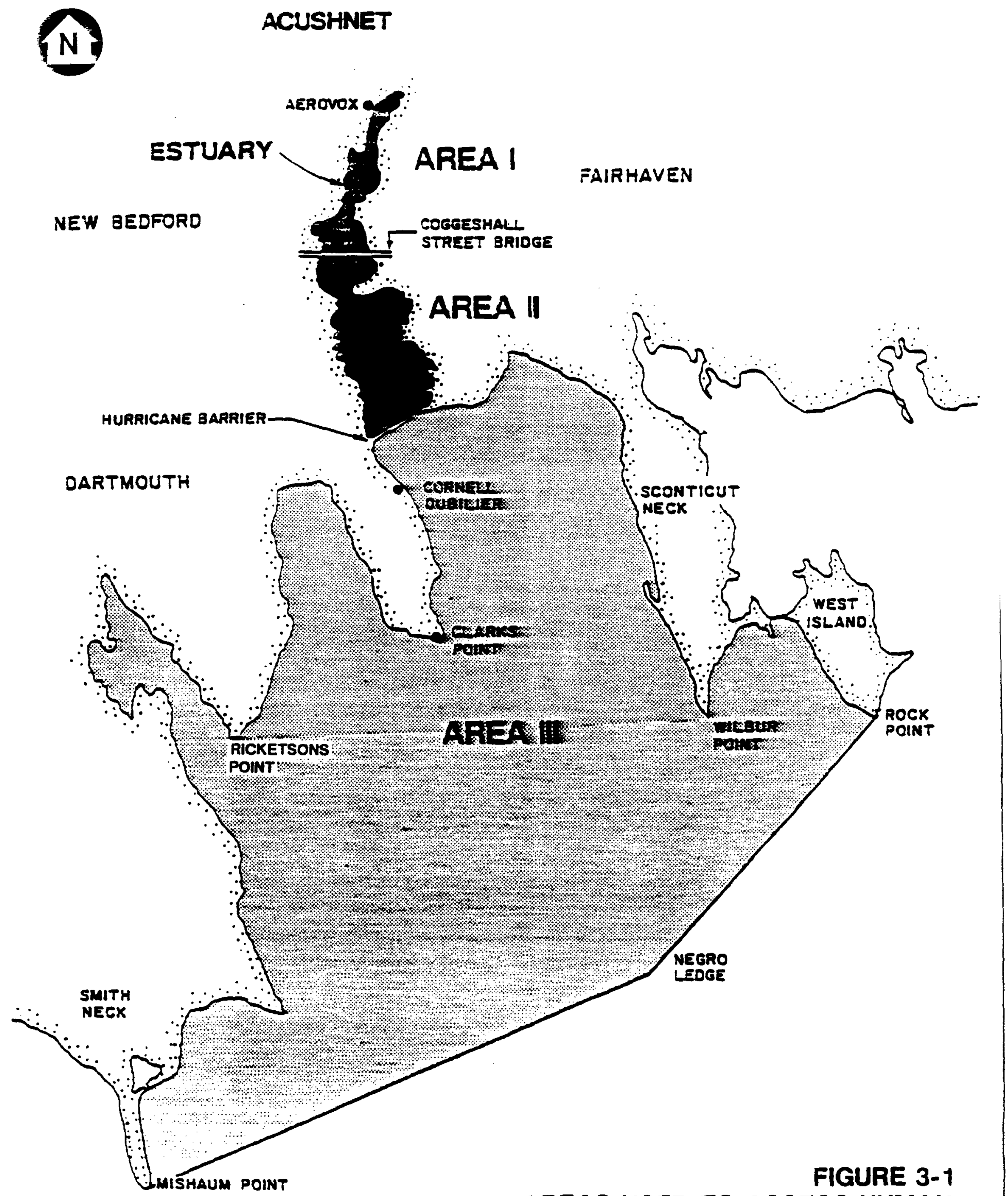


FIGURE 3-1
AREAS USED TO ASSESS HUMAN EXPOSURE TO WATER AND SEDIMENT ESTUARY AND LOWER HARBOR AND BAY FEASIBILITY STUDY NEW BEDFORD HARBOR

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using information obtained from Battelle Ocean Sciences (BOS), GCA Corporation (now Alliance Technologies Corporation), and NUS. These data bases are discussed in the Baseline Public Health Risk Assessment (Ebasco/E.C. Jordan Co., 1989b). Additional information used in the risk assessment includes various site investigation reports, the Greater New Bedford Health Effects Study, the Pilot Study conducted by USACE, and the Damage Assessment Report prepared for the National Ocean and Atmospheric Administration.

3.1.1 Methodology

Human health risks were evaluated at specific locations within Areas II and III, where activities likely to result in exposure occur (e.g., swimming, wading, and fishing). Separate risk estimates were developed for Area I (the cove area and the upper and lower estuary) and are discussed in the Hot Spot FS.

Exposure was evaluated at Popes, Palmer, and Marsh islands located in Area II; and at the Fort Rodman and Fort Phoenix state beaches located in Area III (Figure 3-2). All these locations have unrestricted access and most support recreational activities.

Based on results of a screening process designed to identify pathways of exposure at the New Bedford Harbor site, direct contact and incidental ingestion of shoreline sediment and ingestion of aquatic biota were selected as the exposure pathways of primary concern (E.C. Jordan Co./Ebasco, 1989a). The PCB and metals shoreline sediment concentrations in these areas are presented in Table 3-1.

Screening results showed that under worst-case conditions, exposure to PCBs and metals in the surface water does not result in significant contaminant exposure; therefore, this pathway was not evaluated further in the risk assessment.

Limited data were available to assess risks associated with inhalation exposure to metals and PCBs. The available air data for the risk assessment were viewed as representing a "snapshot" of contaminant levels in the area (NUS, 1986). Cadmium, lead, and PCBs were the only contaminants of concern for which air data are available. Cadmium was not detected in any samples and lead concentrations were too low to make a precise determination of ambient levels. Therefore, exposure to these contaminants was not evaluated.

PCB concentrations ranged from below detection limit to 471 nanograms per cubic meter (ng/m^3). Because sample locations were selected to monitor the air in the mudflat area of the upper estuary, these data are not considered to be representative of exposure point concentrations in the lower harbor/bay. As discussed in Section 2.0, volatilization of PCBs

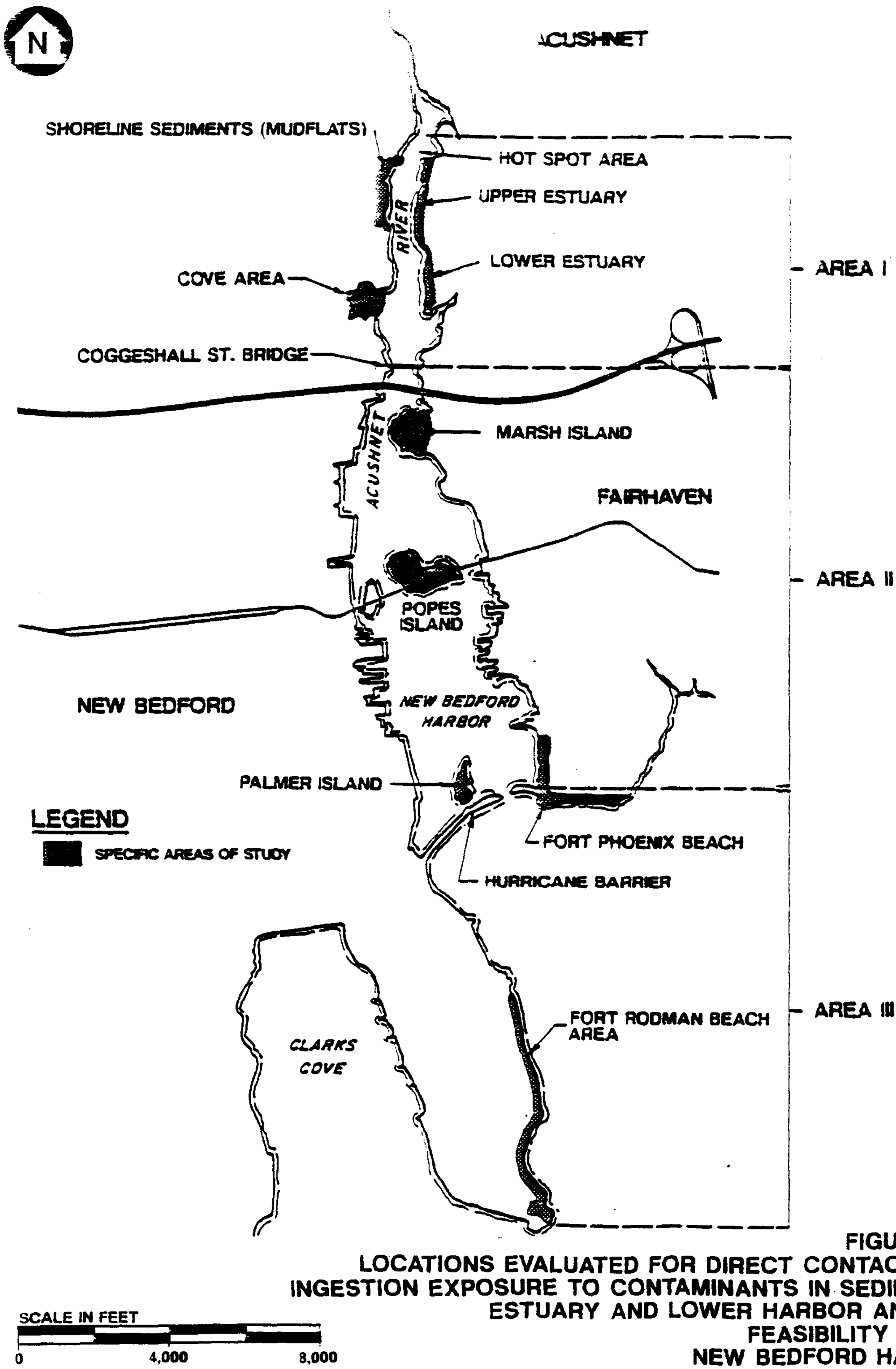


FIGURE 3-2
LOCATIONS EVALUATED FOR DIRECT CONTACT AND INGESTION EXPOSURE TO CONTAMINANTS IN SEDIMENTS
ESTUARY AND LOWER HARBOR AND BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR

4959-22

TABLE 3-1

PCB AND METALS SEDIMENT CONCENTRATIONS (ppm) USED
TO ASSESS DIRECT CONTACT AND INGESTION EXPOSURES

ESTUARY AND LOWER HARBOR/BAY
FEASIBILITY STUDY

	PCBs		CADMIUM		COPPER		LEAD	
	MEAN[a]	MAXIMUM	MEAN[b]	MAXIMUM	MEAN[b]	MAXIMUM	MEAN[b]	MAXIMUM
AREA I								
Shoreline Concentrations								
Entire Area	378	6,393	19.2	69	591	3,180	384	1,680
Upper Estuary	378	6,393	18.8	69	588	1,900	445	1,680
Lower Estuary	149	399	20	63	598	3,180	278	1,330
AREA II								
Shoreline Concentrations								
Entire Area	21	125	7.6	14	570	2,790	160	559
Palmer Island	3	11	ND	ND	310	310	139	139
Popes Island	11	34	ND	ND	492	771	156	272
Marsh Island	8	22	ND	ND	300	463	191	323
AREA III								
Shoreline Concentrations								
Entire Area	4	29	ND	ND	94	154	55	106
Fort Rodman Beach Area	2	7	NA	NA	NA	NA	NA	NA
Fort Phoenix Beach Area	0.59	0.75	NA	NA	NA	NA	NA	NA

Notes:

[a] = Mean concentration for PCBs represents the geometric mean value detected in each area.
[b] = Mean concentration for metals represents the arithmetic mean value of the concentrations detected in each area.
Maximum concentration represents the maximum value detected in each area.
NA = Not Available; shoreline sediment data for metals were unavailable.
ND = Not Detected

from the estuary and lower harbor is considered to be a significant transport mechanism.

However, dilution with clean air and dispersion within the lower harbor/bay are considered to limit the concentration of PCBs in residential areas. A background PCB concentration of 10 ng/m^3 was estimated based on air monitoring conducted by NUS (NUS, 1986). Baseline risks were estimated based on an assumed "background" concentration of 10 ng/m^3 PCB (NUS, 1986). The carcinogenic risks associated with 70-year exposure to this concentration was $8x10^{-6}$. The significance of this route of exposure can be reevaluated as additional data becomes available.

Noncarcinogenic and carcinogenic risks were evaluated in the baseline risk assessment. Noncarcinogenic risk estimates were developed to assess the toxicity from exposure to PCBs, cadmium, copper, and lead. These estimates were generated by comparing the Chronic Daily Intake (CDI) of a contaminant to the most applicable health-based criterion (e.g., reference dose [RfD]) or standard (e.g., Maximum Contaminant Level [MCL]). The ratio of these values (CDI/RfD) was used to evaluate risk in this report.

Generally, EPA states that if the ratio is less than 1, the predicted body dose level is anticipated to be without lifetime risk to human health (EPA, 1986). For example, a value of 0.25 implies that a person is receiving an estimated average daily dose equal to 25 percent of the acceptable intake of that contaminant. If the ratio exceeds 1, the estimated average daily dose levels exceed a level considered safe; therefore, the exposure could potentially result in adverse health effects.

Carcinogenic risk estimates for PCBs (classified by EPA as a probable human carcinogen [Group B2]) were calculated by multiplying the potency factor for PCBs (expressed as $(mg/kg\text{-}day)^{-1}$) by the estimated body dose (expressed as mg/kg-day) of PCBs. The product of these two values represents a conservative estimate of incremental lifetime cancer risk. This risk is defined as the excess probability that an individual will develop cancer over a lifetime under the assumed conditions of exposure.

EPA guidance states that the target total estimated carcinogenic risk for an individual resulting from exposure at a Superfund site may range from 10^{-4} to 10^{-6} (NCP, 55FR8666). In addition to EPA guidance on evaluating health risks at Superfund sites, the Commonwealth of Massachusetts has issued regulations in the Massachusetts Contingency Plan (MCP) that are applicable to the site. The portion of the MCP relevant to this risk assessment requires a permanent solution to be implemented at all disposal sites that effectively eliminates significant or otherwise unacceptable risks to health, safety, public welfare, or the environment. As stated in the MCP, the total site cancer risk should be compared to a cancer risk limit of 1 in 100,000 (10^{-5}). The total site noncarcinogenic risk should be compared to a risk limit represented by a Hazard Index (HI) equal to 0.2. (An HI for a particular exposure pathway is equal to the sum of the risk ratios estimated for individual chemicals.)

The risk estimates generated in the baseline risk assessment were evaluated using the EPA guidance levels and MCP criteria. Response objectives and remedial alternatives are developed as part of the FS to reduce total carcinogenic risks to levels within this range.

3.1.2 Results of the Human Health Risk Assessment for the Lower Harbor/Bay

Numerous risk estimates were developed as part of the baseline human health risk assessment based on potential contaminant exposure via direct contact and incidental ingestion of shoreline sediments and ingestion of biota. Because the concentrations of contaminants and the potential for exposure vary greatly by location within the New Bedford Harbor site, separate risk estimates were generated for the three areas shown in Figure 3-1, as well as the specific locations within a given area (see Figure 3-2). Of the three areas identified, Areas II and III are contained within the study area defined as the lower harbor/bay. Human health risks associated with exposure to contaminants in Area I were addressed in the Hot Spot FS. Major findings of the baseline risk assessment for the lower harbor/bay are discussed in the following subsections.

3.1.2.1 Sediment

Area II. Most of the shoreline in Area II is not readily accessible. Private property abutting the shoreline is fenced and much of the land use is classified as industrial. However, three locations within this area are accessible and support recreational land uses: Popes, Marsh, and Palmer islands.

The incremental carcinogenic risks associated with contaminant exposure around Palmer Island were greater for young children (ages 0-5 years) and older children (ages 6-16 years) than for adults (ages 17-65 years). Risk estimates based on probable exposure conditions for these age classes ranged from $2x10^{-7}$ to $2x10^{-6}$. Under more conservative exposure conditions, the risk estimates for children were higher, ranging from $4x10^{-6}$ to $4x10^{-5}$.

The concentration distribution of PCBs in shoreline sediment from Palmer Island shows that 93 percent of the PCB concentrations are less than 5 ppm, indicating that potential exposure in this area is reflected by the assumptions used in the probable exposure scenario (e.g., exposure to 3 ppm PCB).

Because these risk estimates fall at or below the lower end of the target range, exposure in this area is not considered to present a human health risk.

The risk estimates generated for exposure to sediment around Marsh Island were greatest for younger children and older children, ranging from $5x10^{-7}$ to $5x10^{-6}$ under probable exposure conditions, and $8x10^{-6}$ to $8x10^{-5}$ under conservative exposure conditions.

The concentration distribution of PCBs in sediment from the Marsh Island area indicates that 77 percent of the PCB concentrations are less than 8 ppm, similar to the concentration used to assess risk under probable exposure conditions. Risk estimates based on exposure by children to 8 ppm PCBs under probable exposure conditions range from $5x10^{-7}$ to $5x10^{-6}$. These risk estimates fall within the lower end of the target range and are considered reflective of the likely exposure conditions in this area.

The concentrations of PCBs in sediment from Popes Island are higher than those detected at either Marsh or Palmer island. The risks associated with exposure to this sediment are within or slightly above the target range, with two scenarios exceeding a 10^{-4} lifetime cancer risk. The incremental carcinogenic risks were greatest for younger children and older children. These risks ranged from $8x10^{-7}$ to $8x10^{-6}$ under probable exposure conditions, and from $1x10^{-5}$ to $1x10^{-4}$ under conservative exposure conditions. Because the 50th percentile of PCB concentrations from this area is greater than the concentration used to evaluate risk under probable exposure conditions, the risks developed under the conservative scenarios are considered to reflect likely exposure conditions in this area.

Noncarcinogenic risks associated with direct contact exposure to metals-contaminated sediment were not considered to present a human health risk. The multitoxic risk ratio (or HI) based on concurrent exposure to cadmium, copper, and lead were all below 0.2 under both conservative and probable exposure conditions. Exposure through ingestion of metals-contaminated sediments was associated with HI values in excess of 0.2. The majority of risk was associated with exposure to lead.

<u>Area III</u>. Direct contact exposure to PCBs in sediment in Area III was assessed for the Fort Rodman and Fort Phoenix state beach areas (see Figure 3-1). Risk estimates based on exposure to shoreline sediments fell within or below the target range (i.e., $2x10^{-8}$ to $3x10^{-5}$ for probable and conservative exposure assumptions, respectively). Noncarcinogenic risks associated with metals exposure were not considered to present a human health risk.

3.1.2.2 Biota

Exposure to PCBs through ingestion of biota was assessed based on concentrations detected in lobster, winter flounder, and clams. These species were considered representative of the biota most commonly consumed in the New Bedford Harbor area. Edible-tissue PCB concentrations were used when available. The range of PCB concentrations evaluated in this risk assessment was 0.039 to 2.7 ppm (Battelle, 1989). Exposure frequencies of one fish meal per day, per week, and per month were assumed. A fish meal was considered to be an 8-ounce (227 grams) portion for older children and adults, and a 4-ounce (115 grams) portion for younger children.

The risks from exposure to contaminants via ingestion of biota were greatest for children. Both noncarcinogenic and carcinogenic risks were estimated to be in excess of EPA and state guidelines. The risk ratios calculated based on weekly ingestion of biota by a child, and concurrent exposure to the mean PCB and metals concentrations detected in the three species, ranged from 4 to 28. This range increased to 14 to 85 when assuming exposure to the maximum contaminant concentration detected in each species. The majority of risk was associated with exposure to PCBs and lead. The carcinogenic risk estimates for a child (chronic exposure to PCBs) range from $4x10^{-5}$ to $8x10^{-3}$ for biota collected in Area II; $3x10^{-5}$ to $5x10^{-3}$ for biota collected in Area III; and $8x10^{-6}$ to $2x10^{-3}$ for biota collected in Area IV (E.C. Jordan Co./Ebasco, 1989a).

3.2 ECOLOGICAL RISK ASSESSMENT

The ecological risk assessment for the New Bedford Harbor site examined potential risks to marine biota due to exposure to PCB and metals contamination in sediment and in the water column. The focus of this document concerns the effects of contamination in the lower harbor/bay.

3.2.1 Methodology

EPA defines ecological risk resulting from exposure to toxic contaminants to include both direct risks to the growth, reproduction, or survival of the ecological receptor species, as well as risk that the resource value of any species will be reduced as a result of contaminant body burdens. Although both aspects of risk are considered in the baseline risk assessment, the focus of this risk assessment is on the direct risks.

Ecological risks in New Bedford Harbor were determined by a mathematical evaluation and combination of two factors: the degree of exposure to contaminants at the site and the ecotoxicity of PCBs and the three metals to aquatic organisms. Ecological risk was then quantified as the probability of impact on specific taxonomic groups representing the major ecotypes present in the harbor.

Twenty-eight species were identified as aquatic receptors in the harbor (E.C. Jordan Co./Ebasco, 1990a). These species, considered representative of the range of organisms in New Bedford Harbor, included species from each major trophic level. Routes of exposure considered in the assessment included direct contact with water and sediment, and ingestion of contaminated food. EPA AWQC, laboratory-derived toxicity data, and site-specific toxicity data (when available) were used in the risk assessment.

Exposure to contaminated sediment and contaminants in the water column was evaluated separately for each of the five harbor areas (i.e., Zones 1 through 5). Zone 1 represents the estuary, and all of Zones 2, 3, 4, and 5 represent the study area defined as the lower harbor/bay. The area boundaries correspond to those in the Battelle chemical/physical transport model, and are identified in Figure 3-3.

Risk to aquatic biota was evaluated using a joint probability analysis in which two probability distributions, one representing contaminant levels in various zones of the harbor and the second representing the sensitivity of biota to contaminants, were combined to present a comprehensive probabilistic evaluation of risk. The statistical comparison of these distributions permit the generation of probabilities that the toxicological benchmarks would be exceeded in a particular area. PCB exposure concentrations were calculated from the initial conditions sediment concentration data for the physical/chemical model using partition coefficients (k_d). Values for site-specific apparent k_ds in New Bedford Harbor are available from experiments conducted by BOS and literature review (Brownawell and Farrington, 1986).

The joint probability analysis was supplemented by comparison of PCB levels in New Bedford Harbor to EPA AWQC, evaluation of site-specific toxicity tests, and examination of data on the structure of faunal communities in the harbor.

Body burden of PCBs, cadmium, copper, and lead was evaluated for these same five zones by comparing observed tissue concentrations in biota with species-specific toxicity data.

3.2.2 Results of Environmental Baseline Assessment

Results of these various approaches to evaluating risk support, both together and independently, the conclusion that aquatic organisms are at significant risk due to exposure to PCBs in New Bedford Harbor. Some risk due to exposure to metals was also identified but was negligible in comparison to the risk due to PCBs.

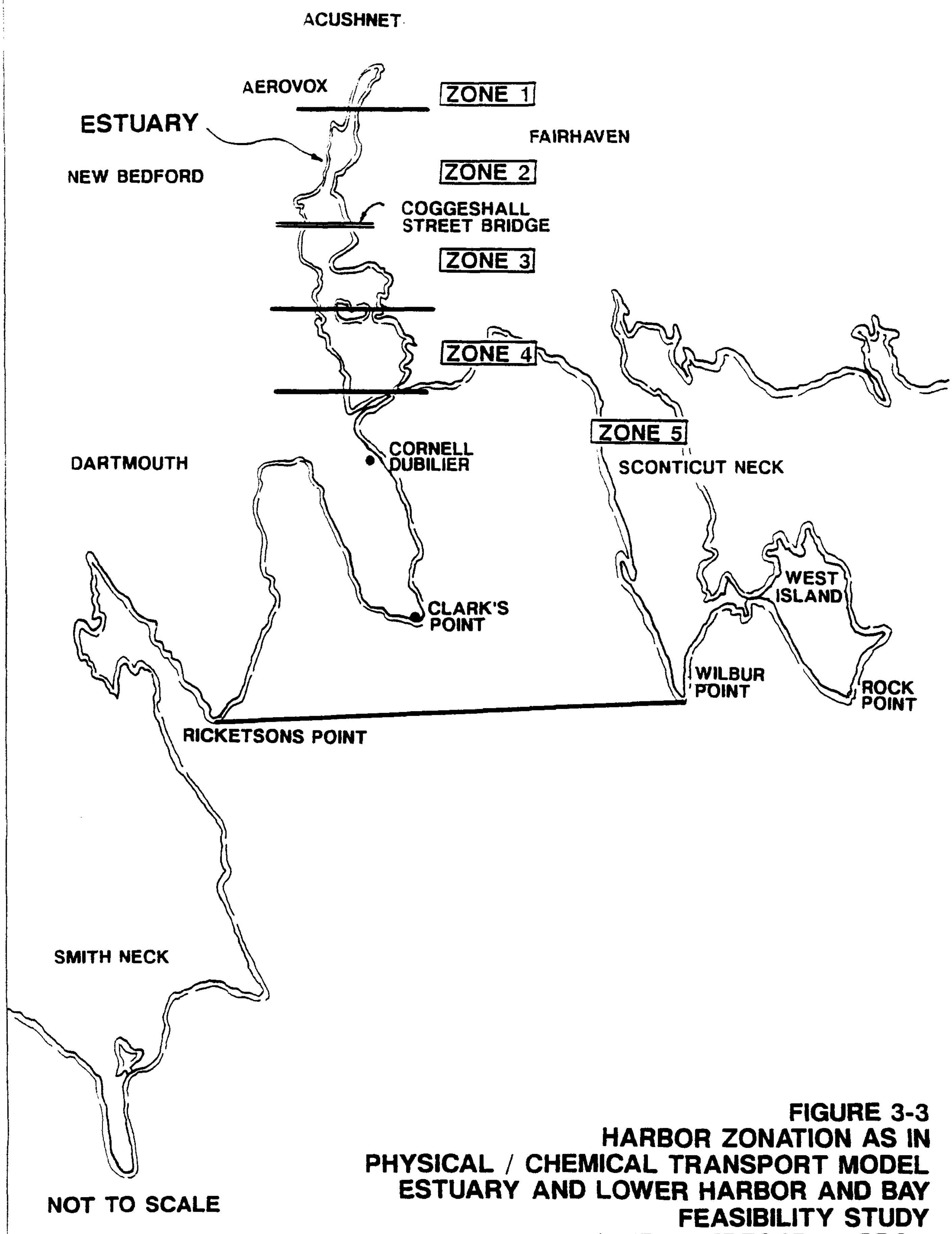


FIGURE 3-3
HARBOR ZONATION AS IN
PHYSICAL / CHEMICAL TRANSPORT MODEL
ESTUARY AND LOWER HARBOR AND BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR

Concentrations of dissolved PCBs in all areas of the inner harbor (i.e., north of the Hurricane Barrier) were sufficiently elevated to result in a significant likelihood of chronic effects to indigenous biota. PCB concentrations in sediment and sediment pore water in many areas of the harbor were found to be highly toxic to at least some members of all major taxonomic groups of organisms.

The risk probabilities for all major taxonomic groups suggest that marine fish may be substantially affected in Zones 1 through 5. In addition to the joint probability analysis, comparisons of PCB-sediment concentrations were made to the interim Sediment Quality Criteria (SQC) for PCBs (Aroclor 1254). SQC were developed for a number of hydrophobic organic compounds based on their expected partitioning between sediment organic matter and interstitial water (Field and Dexter, 1988). These SQC were developed by the Criteria and Standards Division of EPA to provide numerical standards for sediment-bound contamination, which are designed to protect aquatic life (Field and Dexter, 1988). The upper and lower 95 percent confidence intervals (CIs) for the SQC represent the range within which the actual sediment criteria value is expected to fall. The lower CI value is taken to represent the concentration which, with 97.5 percent certainty, will result in protection from chronic effects. The mean sediment concentrations in each zone were compared to the lower-bound 95 percent CI and the maximum concentration compared to the PCB SQC.

As discussed in the baseline risk assessment, the TOC values for the New Bedford Harbor area range from approximately 1 to 10 percent with the highest TOC concentrations located in the estuary and lowest TOC associated with the bay sediments. The approximate average TOC values are 10, 5, and 1 percent for the estuary, lower harbor and Buzzards Bay, respectively.

Assuming an average TOC concentration of 10 percent in the sediment, the carbon-normalized SQC is 4.2 miligrams per kilogram (mg/kg), with a lower-bound CI of 0.83 mg/kg. Essentially, all areas of the harbor exceed the lower 95 percent CI of 0.83 mg/kg. The carbon-normalized PCB SQC for the harbor (average TOC concentration of 5 percent and Buzzard Bay area (average TOC concentration of 1 percent) are 2.1 mg/kg and 0.42 mg/kg, respectively, with a lower-bound CI of 0.41 mg/kg (harbor) and 0.08 mg/kg (Buzzards Bay). These results suggest that PCB concentrations in Zones 1 and 2 pose a significant risk to aquatic organisms in New Bedford Harbor.

Measured PCB concentrations in winter flounder (i.e., body burdens) from all areas of New Bedford Harbor were found to exceed levels determined by Black and Capuzzo to correlate with reproductive effects or growth rate reductions (Black, 1986; and

Capuzzo, 1986). These effects were found to occur at organ-specific concentrations in winter flounder as low as 0.1 ppm. PCB levels in gonadal tissue of winter flounder collected from Zones 1, 2, and 3 exceed these levels.

The joint probability analysis for metals and the comparison of metals concentrations to AWQC indicate a potential risk to marine biota. Concentrations of copper in the water column exceeded the applicable criterion. Crustaceans were determined to be the taxon most likely at risk from copper exposure. Although exposure to metals may result in deleterious impacts on the harbor ecosystem, the effects of PCB exposure are considered far greater and more significant.

Based on these evaluations, it is probable that the structure and function of the New Bedford Harbor ecosystem have been affected by PCB contamination. Levels of PCBs, particularly in Zones 1 and 2, are sufficient to result in mortality, decreased reproduction, and decreased food resources to higher trophic level biota. A study of benthic populations in the harbor indicated impaired community structure in the upper estuary, and toxicity tests conducted by EPA demonstrated the toxicity of sediment from this area to amphipod crustaceans (USACE, 1986; and Hansen, 1986).

Potential community or ecosystem level impacts due to PCBs in New Bedford Harbor cannot be evaluated fully by assessing impacts to individual species or taxonomic groups. However, the state of development of ecological risk assessment methodology does not allow quantification of impacts or risk at these higher levels. Nonetheless, the results of numerous site-specific and laboratory studies, including this risk assessment, indicate that New Bedford Harbor is an ecosystem under stress and there is a high probability that PCBs are a significant contributing factor to the integrity of the harbor as an integrated functioning ecosystem.

Several infaunal surveys have been performed at New Bedford Harbor. Despite the fact that many ecological factors, in addition to chemical contamination, can contribute to areal differences in the numbers and kinds of organisms, these results generally support the conclusion that PCBs are adversely affecting New Bedford Harbor.

An extensive benthic sampling program was conducted for USACE using 26 sampling locations spanning all areas of the harbor (USACE, 1986). Significant correlations between the level of PCB contamination in the harbor and several measures of community, including the number of species, and diversity and evenness indices were found. Due to differences in the sampling methodology used during the program, there is some concern regarding comparability of the sampling data. However, the overall trends relating benthic community descriptors to PCB levels appear to be robust. The basic pattern observed was a domination in the Upper Estuary by the polychaete, Streblospio benedicti, with another polychaete, Tharyx acutus, being dominant in the rest of the inner harbor. Outside the Hurricane Barrier, bivalves and gastropods became the most common organisms. Associated with these taxonomic differences were an increase in the species diversity of the infaunal community, and a more equal representation of individual species, from the upper estuary into the outer harbor.

A comparative study of this nature suffers from the gross differences in habitat between different locations. It is possible that physical factors (e.g., sediment characteristics and turbidity) are the primary determinants of the community patterns observed. However, these results do not contradict the conclusions arrived at previously regarding risks associated with different zones. Polychaetes are, in general, less sensitive to sediment contamination than other taxa (Rubinstein, 1989); their general domination of the most highly contaminated sediments at the harbor is suggestive of the impact that PCBs and other chemicals may be having on this ecosystem.

A wetland study compared chemical and biological data from six wetland areas in New Bedford Harbor and from a relatively unpolluted reference area in Buzzards Bay (IEP, Inc., 1988). They found a depauperate benthic community in the Zone 1 wetland. In addition, a comparison of the biological data between a Zone 2 wetland with the reference area indicated significant differences in species diversity and evenness, particularly among polychaetes, amphipods, and mollusks. However, habitat differences complicate any attempt to relate differences in benthic community patterns to variation in the PCB contamination between these locations.

3.3 OTHER APPROACHES TO EVALUATING ECOLOGICAL RISK

The joint probability analysis and SQC comparison used in the baseline risk assessment for New Bedford Harbor are two of many methodologies available to evaluate ecological risk. Unlike human health risk evaluations, a single approach has not yet been established. This is due in part to the difficulties in predicting and evaluating the effects of contamination on an ecosystem. Each ecosystem has unique biotic and abiotic characteristics that must be understood to evaluate potential effects from contaminant exposure. It is therefore not possible to establish standardized exposure parameters or methodologies suitable for "ecological risk evaluations." As such, different investigators have proposed various methods for evaluating potential ecological effects.

Other valid approaches are described in the following subsections for both comparative purposes and to assist in determining the need for and extent of remediation at this site. These four additional approaches are considered appropriate for evaluating risks to aquatic ecosystems such as New Bedford Harbor.

3.3.1 Equilibrium Partitioning

The Equilibrium Partitioning (EP) approach compares predicted interstitial water concentrations derived from EP theory and observed sediment contaminant levels to existing water quality criteria (e.g., AWQC). Acceptable contaminant concentrations or ranges of concentrations based on the AWQC or other criteria can be established. For New Bedford Harbor, the K_ds for the different Aroclors can be used to estimate acceptable sediment PCB concentrations. Using the AWQC of 0.03 micrograms per liter (ug/L) PCB, the total PCB concentration in sediments is 41.8 micrograms per grams, organic carbon normalized (mg/koc), with a 95 percent CI of 8.29 to 214 ug/goc. To convert these values to site-specific sediment criteria on a dry-weight basis, they can be multiplied by the TOC fraction in the sediment. Assuming a TOC of 5 percent for the lower harbor, the acceptable sediment PCB concentration range using the EP methodology is 2.1 mg/kg with the 95 percent CI 0.4 to 11 mg/kg PCB. A significant portion of the lower harbor/bay has sediment PCB concentrations in excess of this range. Subsection 2.2.3 describes the PCB distribution in the study area and Figure 2-7 illustrates this information.

The EP approach, as applied to New Bedford harbor, provides the same target PCB sediment concentrations as the carbon-normalized SQC approach. This results from the use of the AWQC of 0.03 ug/l PCBs as the acceptable concentration in water. It should be noted that the AWQC for PCBs is based on a residue concentration in biota following bioconcentration of these compounds. Water quality guidelines based strictly on the chronic toxicity effects of PCBs do not exist.

3.3.2 Apparent Effects Threshold

The Apparent Effects Threshold (AET) approach uses field data (e.g., chemical concentrations in sediment) and at least one biological indicator of injury (e.g., sediment bioassays, altered benthic infaunal abundance, bioconcentration, and histopathology) to determine the concentration of a given contaminant above which statistically significant biological effects would be expected (Field and Dexter, 1988). The AET requires a large data base on contaminant toxicity and site-specific information. One potential limitation of the AET methodology is that the results can be strongly influenced by the presence of unmeasured, covarying toxic contaminants (Field and Dexter, 1988). The following AET values for total PCBs values were developed for Puget Sound, Washington:

	Amphipod	Oyster	Benthic Infauna
AET ug/goc	190	>46	65
AET ug/g (dry weight)	3.1	1.1	1.0

These values are presented for illustrative purposes. The site-specific nature of the AET methodology limits the application of these values to New Bedford Harbor.

3.3.3 Screening Level Concentrations

The Screening Level Concentration (SLC) approach compares field data on sediment contaminant concentrations to the presence or absence of benthic species. The SLC is an estimate of the highest concentration of a particular contaminant in sediment that can be tolerated by approximately 95 percent of benthic infauna (Field and Dexter, 1988). A cumulative frequency distribution of a specific species is plotted against the sediment contaminant concentration, and the 90th percentile is termed the Species Screening Level Concentration (SSLC). These SSLC levels, in turn, are plotted for a large number of species as a frequency distribution; the SLC is defined as the concentration above which 95 percent of these levels are found. The saltwater SLC value for total PCBs is 3.66 ug/goc (range zero to 4.58). Assuming 5 percent TOC in the lower harbor, the SSLC for New Bedford Harbor is 0.2 (range zero to 0.2). As discussed in Subsection 2.2.3, a significant portion of the study area exceeds this value.

In general, the SLC values have proven to be very conservative in comparison to values derived using other approaches. As with the AET, the SLC requires a large data base with a broad range of toxicant concentrations to define the influence of a particular contaminant. The major limitation of this approach is that the presence of a species at a site does not necessarily imply lack of biological effect (Field and Dexter, 1988).

3.3.4 Sediment Quality Triad

The Sediment Quality Triad (SQT) uses sediment chemistry, toxicity, and biological effects to determine sediment concentrations that discriminate conditions of minimal, uncertain, and major biological effects. It is recommended that site-specific criteria be developed for various locations within a study area, based on the local chemical and biological data. This procedure was used to develop sediment quality levels for total PCBs in Puget Sound, Washington. These values were reported as follows:

Criteria Description	Criteria
No or minimal effects	≤0.1 ug/g (dw)
Severe effects	≥0.8 ug/g (dw)

The triad approach requires a definition of "minimal" and "severe" biological effects to establish criteria. These definitions are subjective depending on the particular objectives of the site-specific ecological assessment. The site-specific nature of these values limits their application to New Bedford Harbor. However, they do provide an indication of the potential risks associated with PCB exposure. Areas in the lower harbor/bay exceed by over an order of magnitude these criteria values, suggesting the potential for adverse ecological effects.

3.3.5 Summary

A review of four general approaches to evaluating ecological risk (i.e., EP, SLC, AET, and SQT) was undertaken to support conclusions of the baseline risk assessment and to assist in the development of PCB TCLs for New Bedford Harbor. Certain limitations exist that preclude a direct comparison between the developed criteria values and contaminant concentrations in New Bedford Harbor. However, these methodologies can be used to provide a qualitative evaluation of the potential ecological risks at this site.

The sediment PCB concentrations considered to be protective of aquatic resources identified using the four approaches described above range from approximately 0.01 to 1.0 ppm PCB. These values are derived from a review of published information on the bioaccumulation and toxicological effects of PCBs and on site-specific toxicity information. A comparison of this range of values to the current extent of PCB contamination in sediments in the estuary and the lower harbor/bay shows a significant area in excess of the upper concentration of 1 ppm (see Subsection 2.2.3 and Figure 2-7). Although it is recognized that the range 0.01 to 1.0 ppm has a substantial but undefined uncertainty, the magnitude and extent to which this range is exceeded support the conclusions of the baseline risk assessment that it is likely that the presence of PCBs may cause adverse ecological effects.

4.0 IDENTIFICATION OF REMEDIAL ACTION OBJECTIVES, APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS, AND GENERAL RESPONSE ACTIONS

Remedial action objectives serve as guidelines in the development of alternatives for remediation. The remedial action objectives specify the contaminants and media of interest, exposure pathways, and preliminary remediation goals.

The site-specific ARARs and the remedial action objectives for the estuary and lower harbor/bay areas are discussed in Subsections 4.2 and 4.3, respectively. These objectives are subsequently used to develop general response actions (see Subsection 4.4) that will formulate the basis for the selection of technologies (see Section 5.0), and the development and evaluation of alternatives for remediation of the estuary and lower harbor/bay areas (see Sections 6.0 and 7.0).

4.1 INTRODUCTION

Remedial actions, as defined by 300.5 of the National Contingency Plan (NCP), are those responses to releases that are consistent with a permanent remedy to protect against or minimize release of hazardous substances, pollutants, or contaminants so they do not migrate to cause substantial danger to current or future human health and welfare or the environment.

In formulating a remedy, CERCLA requires EPA to emphasize risk reduction through destruction or treatment of hazardous waste. Section 121 of SARA establishes a statutory preference for remedies that permanently and significantly reduce the mobility, toxicity, or volume of hazardous waste over remedies that do not use such treatment. Section 121 also requires EPA to select a remedy that is protective of human health and the environment, is cost-effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. Furthermore, Section 121 requires that, upon completion, remedies must attain ARARs unless specified waivers are granted.

Section 300.430 of the NCP, in conjunction with EPA guidance on conducting FSs, sets forth the remedial alternative development and evaluation process (EPA, 1988). This process consists of the following steps:

- o Identify the nature and extent of contamination and threat presented by the release (300.430[d][2]).
- o Identify general response objectives for site remediation (300.430[e][2][i]).

- Identify and evaluate remedial technologies potentially applicable to wastes and site conditions (300.430[e][2][ii]).

- Develop alternatives to achieve site-specific response objectives (300.430[e][2][iii]).

- Conduct initial screening of alternatives (300.430[e][7]).

- Conduct detailed analysis of alternatives (300.430[e][9]).

Figure 4-1 is an overview of the FS process for the New Bedford Harbor Superfund site.

As an initial step, both CERCLA and the NCP require identification of the nature and extent of site contamination. The nature and distribution of contamination and the threat posed by the release of contaminants from the estuary and lower harbor/bay areas are discussed in Sections 2.0 and 3.0. Beyond initial site characterization, Section 121 of SARA retains the basic framework for the remedial alternatives development and remedy selection process enacted through NCP; however, each phase must be modified to reflect the provisions of SARA.

4.2 SITE-SPECIFIC ARARS

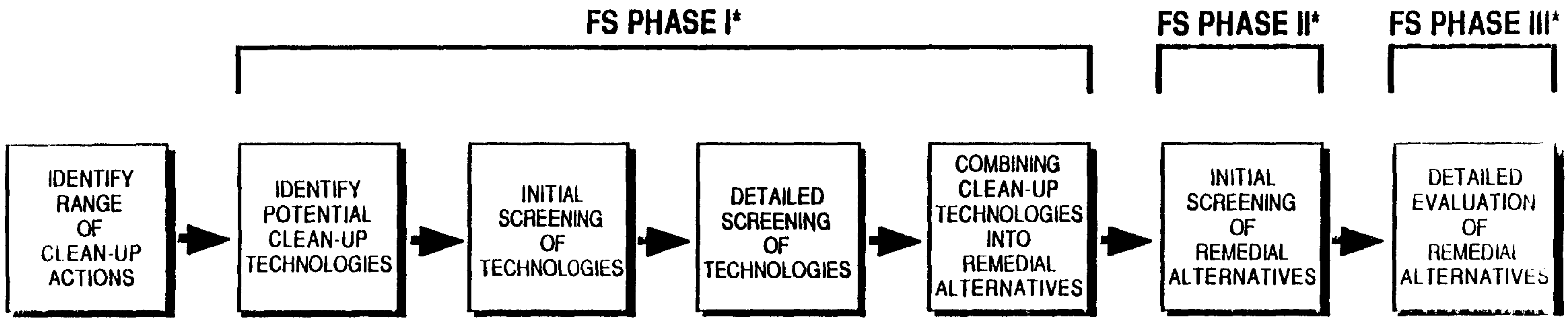
Section 121(d) of SARA and the NCP require that CERCLA remedial actions comply with all federal ARARs. State requirements must also be attained under Section 121 (d)(2)(c) of SARA, if they are legally enforceable and consistently enforced statewide. ARARs are used to determine the appropriate extent of site cleanup, identify and formulate remedial action alternatives, and govern the implementation and operation of the selected action. According to SARA, requirements may be waived by EPA under the following six specific conditions, provided protection of human health and the environment is still assured:

- The selected remedial action is an interim remedy.

- Compliance with such requirements will result in greater risk to human health and the environment than alternative options.

- Compliance with such requirements is technically impracticable from an engineering perspective.

- The selected remedial action will provide a standard of performance equivalent to other approaches required under applicable regulations.



* EPA OSWER DIRECTIVE OCTOBER, 1988: GUIDANCE FOR CONDUCTING REMEDIAL INVESTIGATION AND FEASIBILITY STUDIES UNDER CERCLA

FIGURE 4-1
OVERVIEW OF THE FS PROCESS
ESTUARY AND LOWER HARBOR AND BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR

4959-25

- The requirement is a state requirement that has been inconsistently applied.

- Attainment of the ARAR would entail extremely high costs relative to the added degree of reduction of risk afforded by the standard (i.e., fund balancing).

In this subsection, the approach to ARARs for the estuary and lower harbor/bay FS is discussed, and potential ARARs are identified.

4.2.1 Definition of ARARs

To consider ARARs and, more importantly, to incorporate consideration of ARARs in the FS and remedial response processes, the NCP and SARA defined both applicable requirements and relevant and appropriate requirements as follows.

Applicable Requirements. Applicable requirements are those federal and state requirements that would be legally applicable, either directly or as incorporated by a federally authorized state program, if response actions were not taken pursuant to Section 104 or 106 of CERCLA.

Requirements that are applicable to and have jurisdiction over given situations are considered "applicable requirements." An example of an applicable requirement would be MCLs for a site that exhibits groundwater contamination entering a public water supply.

Relevant and Appropriate Requirements. Relevant and appropriate requirements are those federal and state requirements that, while not legally "applicable," can be applied if the decision-maker's best professional judgment determines that site circumstances are sufficiently similar to those situations that are jurisdictionally covered, and use of the requirement makes good sense. During the FS process, relevant and appropriate requirements are intended to have the same weight and consideration as applicable requirements.

The term "relevant" was included so that a requirement initially screened as nonapplicable because of jurisdictional restrictions would be reconsidered and, if appropriate, included as an ARAR for the site. For example, MCLs would be nonapplicable, but relevant and appropriate for a site that exhibited groundwater contamination in a potential (as opposed to an actual) drinking water source.

Other Requirements to be Considered. A third category of requirements to be considered is federal and state nonregulatory requirements (e.g., guidance documents or criteria).

Nonpromulgated advisories or guidance documents do not have the status of ARARs. However, where there are no specific ARARs for a chemical or situation, or where such ARARs are not sufficient to be protective, guidance or advisories should be identified and used to ensure that a remedy is protective.

4.2.2 Development of ARARs

Under the description of ARARs set forth in the NCP and SARA, many federal and state environmental requirements must be considered. These requirements include ARARs that are:

- o chemical-specific (i.e., govern the extent of site cleanup)
- o location-specific (i.e., pertain to existing site features)
- o action-specific (i.e., pertain to proposed site remedies and govern implementation of the selected site remedy)

A separate document entitled, "Regulation Assessment for New Bedford Harbor" was published for the New Bedford Harbor site that has identified the potential chemical-, location-, and action-specific ARARs (E.C. Jordan Co./Ebasco, 1990b). This document identifies both federal and state ARARs and summarizes the procedural and technical requirements of these regulations. ARARs pertinent to the estuary and lower harbor/bay areas are summarized in the following subsection.

4.2.2.1 Chemical-specific ARARs

Chemical-specific ARARs govern the extent of site cleanup and provide either actual clean-up levels or a basis for calculating such levels. For example, surface water criteria and standards, as well as air standards, provide necessary clean-up goals for the estuary and lower harbor/bay FS.

Chemical-specific ARARs are also used to indicate acceptable levels of discharge to determine treatment and disposal requirements, and to assess the effectiveness of remedial alternatives. Table 4-1 lists and summarizes potential chemical-specific ARARs. Chemical-specific ARARs apply to every alternative. Descriptions of chemical-specific ARARs for surface water and air follow.

Surface Water. Surface water in the estuary and lower harbor/bay is governed generally by the federal Clean Water Act (CWA) and specifically by the Massachusetts Surface Water Quality Standards (310 CMR 4.00). The federal statute has a general mandate to preserve water quality. The state develops

TABLE 4-1
POTENTIAL CHEMICAL-SPECIFIC ARARS AND CRITERIA, ADVISORIES, AND GUIDANCE

ESTUARY AND LOWER HARBOR/BAY FEASIBILITY STUDY
NEW BEDFORD HARBOR, MASSACHUSETTS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CONSIDERATION IN THE RI/FS
Surface Water				
Federal Regulatory Requirements	Federal Food, Drug and Cosmetic Act	Applicable	This act sets forth FDA limit of 2 ppm for PCB concentrations in commercial fish and shellfish.	This level will be used as an ultimate clean-up level to which alternatives will be evaluated.
State Regulatory Requirements	MADEP - Massachusetts Surface Water Quality Standards (310 CMR 4.00)	Applicable	MADEP surface water quality standards incorporate the federal AWQC as standards for surface waters of the state.	AWQC applicable to the Estuary and Lower Harbor/Bay area are as follows: PCBs - 10 ppb (acute effects on aquatic life) - 0.03 ppb (chronic effects on aquatic life) Cadmium - 43 ppb (acute effects) 9.9 ppb (chronic effects) Copper - 2.9 ppb (acute effects) 2.9 ppb (chronic effects) Lead - 140 ppb (acute effects) - 5.6 ppb (chronic effects)
Federal Criteria, Advisories, and Guidance	Federal Ambient Water Quality Criteria (AWQC)	Applicable	Federal AWQC are health-based criteria developed for 95 carcinogenic and noncarcinogenic compounds.	AWQC are incorporated into MADEP standards as discussed above. The PCB criterion is based on the old 5-ppm FDA standard. Clean up targets may be modified to reflect current guidance levels, which are lower.
Air				
Federal Regulatory Requirements	CAA - National Ambient Air Quality Standards (NAAQS) - 40 CFR 40.	Relevant and Appropriate	These standards were primarily developed to regulate stack and automobile emissions.	Standards for particulate matter will be used when assessing excavation and emission controls for sediment treatments.
State Regulatory Requirements	MADEP - Air Quality, Air Pollution (310 CMR 6.00 - 8.00).	Relevant and Appropriate	These standards were primarily developed to regulate stack and automobile emissions.	Alternatives involving excavation, air, and emission controls for sediment treatments will be compared against these standards.
Federal Criteria, Advisories, and Guidance	Threshold Limit Value (TLV)	To Be Considered	These standards were issued as consensus standards for controlling air quality in workplace environments.	TLVs could be used for assessing site inhalation risks for soil removal operations.

general criteria for surface water quality and determining standards. The federal AWQC are applicable to the estuary and lower harbor because they are incorporated as Massachusetts surface water quality standards. Under these rules, the concentration of contaminants in sediments will need to be at levels that assure that water in the estuary and lower harbor/bay meets regulatory criteria.

The Federal Food, Drug, and Cosmetic Act (FFDCA) must also be considered because it establishes a tolerance level of 2 ppm of PCBs in commercial fish and shellfish (49[100]FR21514).

Remedial alternatives that propose technologies that generate process water, leachate, or supernatant to be returned to the harbor will be subject to the CWA and Massachusetts Surface Water Quality Standards. Discharge waters will have to meet the standards promulgated by the state.

Air. Federal and state air regulations that establish concentration limits for particulate matter are considered chemical-specific ARARs where excavation activities, for example, may generate dust and debris. Massachusetts has set an Allowable Ambient Level (AAL) of 0.0005 micrograms per cubic meter for PCBs; however, in certain areas of the estuary and lower harbor/bay, the existing background air quality currently exceeds this AAL.

4.2.2.2 Location-specific ARARs

Location-specific ARARs govern natural site features such as wetlands and floodplains, as well as manmade features including existing landfills, disposal areas, and local historic buildings. Location-specific ARARs are generally restrictions on the concentration of hazardous substances or the conduct of activities solely because of the site's particular characteristics or location. These ARARs provide a basis for assessing existing site conditions and subsequently aid in assessing potential remedial alternatives. Table 4-2 lists and summarizes potential location-specific ARARs. For the estuary and lower harbor/bay FS, applicable location-specific ARARs will be requirements that protect wetland and floodplain areas. Some location-specific ARARs may be interpreted as action-specific ARARs, such as those requiring permits or licenses for work performed in a waterway, floodplain, or wetland. However, they are described herein to provide continuity for discussions of regulations affecting proposed remedial alternatives of the estuary and lower harbor/bay sediments. According to SARA, remedial actions undertaken entirely on-site need to comply only with substantive aspects of ARARs and not with corresponding administrative requirements (i.e., permits).

TABLE 4-2
POTENTIAL LOCATION-SPECIFIC ARARS AND CRITERIA, ADVISORIES, AND GUIDANCE

ESTUARY AND LOWER HARBOR/BAY FEASIBILITY STUDY
NEW BEDFORD HARBOR, MASSACHUSETTS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CONSIDERATION IN THE RI/FS
Wetlands/Floodplains Federal Regulatory Requirements	Clean Water Act (CWA) 40 CFR Part 404 River and Harbors Act of 1899 (40 CFR Part 230 and 33 CFR Part 320-329)	Applicable	Under this requirement, no activity that adversely affects a wetland shall be permitted if a practicable alternative that has less effect is available. If there is no other practical alternative, impacts must be mitigated. A permit is required for construction of of any structure in a navigable water. Section 307, effluent standards of 1-ppb concentration of PCB, is incorporated into this section by reference. The 1-ppb effluent discharge standard is to be considered for guidance levels.	During the identification, screening, and evaluation of alternatives, the effects on wetlands are evaluated. Effluent levels will be used as guidance levels to which alternatives will be evaluated. Permits will need to be obtained for work to be conducted in navigable areas of the harbor.
	RCRA Location Standards (40 CFR 264.18)	Relevant and Appropriate	This regulation outlines the requirements for constructing a RCRA facility on a 100-year floodplain.	A facility located on a 100-year floodplain must be designed, constructed, operated, and maintained to prevent washout of any hazardous waste by a 100-year flood, unless waste may be removed safely before floodwater can reach the facility or no adverse effects on public health and the environment would result if washout occurred.
	National Environmental Policy Act (42 U.S.C. 4321; 40 CFR Part 6)	Applicable	Sets forth EPA policy for carrying out the provisions of the Wetlands Executive Order (EO 11990) and Floodplain Executive Order (EO11988).	This requirement will be considered during the development of alternatives.
State Regulatory Requirements	MADEP - Wetlands Protection (310 CMR 10.00)	Applicable	These regulations are promulgated under Wetlands Protection Laws, which regulate dredging, filling, altering, or polluting inland wetlands. Work within 100 feet of a wetland is regulated under this requirement. The requirement also defines wetlands based on vegetation type and requires that effects on wetlands be mitigated.	If alternatives involve removing, filling, dredging, or altering a MADEP-defined wetland, a Notice of Intent must be filed with MADEP. If work is conducted within 100 feet of a wetland, a request for a Determination Applicability must be filed. Any person who files a Notice of Intent must demonstrate that the area is not significant to the wetland or that the proposed work will contribute to the protection of the wetland.
Federal Nonregulatory Requirements to be Considered	Wetlands Executive Order (EO 11990)	To be Considered	Under this regulation, federal agencies are required to minimize the destruction loss or degradation of wetlands, and preserve and enhance natural and beneficial values of wetlands.	Remedial alternatives that involve construction must include all practicable means of minimizing harm to wetlands. Wetlands protection considerations must be incorporated into the planning and decision-making about remedial alternatives.

TABLE 4-2
(continued)
POTENTIAL LOCATION-SPECIFIC ARARS AND CRITERIA, ADVISORIES, AND GUIDANCE

ESTUARY AND LOWER HARBOR/BAY FEASIBILITY STUDY
NEW BEDFORD HARBOR, MASSACHUSETTS

MEDIUM/AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	CONSIDERATION IN THE RI/FS
Wetlands/Floodplains Federal Nonregulatory Requirements to be Considered (continued)	Floodplains Executive Order (EO 11988)	To Be Considered	Federal agencies are required to reduce the risk of flood loss, minimize impact of floods, and restore and preserve the natural and beneficial values of floodplains.	The potential effects of any action must be evaluated to ensure that the planning and decision-making reflect consideration of flood hazards and floodplain management, including restoration and preservation of natural undeveloped floodplains.

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Wetlands, Waterways, and Floodplains. For actions involving construction of facilities in wetlands or alterations of wetland property, National Environmental Policy Act (NEPA) regulations (40 CFR Part 6) are applicable. NEPA requires that federal agencies include in decision-making processes appropriate and careful consideration of all environmental effects of the proposed actions, and restore and enhance environmental quality as much as possible. In general, compliance with SARA and the NCP assures compliance with NEPA. Appendix A of 40 CFR Part 6 specifically sets forth policy and guidance for carrying out provisions of the Wetlands Executive Order (EO 11990) and the Floodplain Executive Order (EO 11988). An alternative located in a wetland or floodplain may not be selected unless it is determined that no practicable alternative exists outside the wetland. If no practicable alternative exists outside the resource area, potential harm must be minimized and action taken to restore and preserve the natural and beneficial values.

Section 404 of the CWA regulates the discharge of dredged and fill materials to waters of the U.S. Filling wetlands would be considered a discharge of fill material to waters of the U.S. In addition, Section 10 of the Rivers and Harbors Act of 1899 requires authorization from the Secretary of the Army, acting through USACE, for the construction of any structure in or over any "navigable water of the U.S.," the excavation from or deposition of material in such waters, or any obstruction or alternation in such waters. Procedures for complying with permit conditions are contained in 33 CFR Parts 322, 323.

Guidelines for Specification of Disposal Sites for Dredged or Fill Material at 40 CFR Part 230, promulgated under CWA Section 404(b)(1), maintain that no discharge of dredge or fill material will be permitted if there is a practicable alternative that would have less adverse impact on the aquatic system. Because the estuary and lower harbor/bay sediments are contaminated, no practicable alternative is believed to exist that would remediate the sediment without disturbing the aquatic system.

At the state level, wetlands and land subject to flooding are protected under the Massachusetts Wetlands Protection Act and Wetlands Regulations at 310 CMR 10.00. Anyone proposing an activity within an area subject to protection under the Wetlands Protection Act should file a Notice of Intent (NOI) with the Municipal Conservation Commission and obtain a final Order of Condition before proceeding with the activity. The Wetlands Protection Act also has jurisdiction over a 100-foot buffer zone from the resource area. Activities proposed within the 100-foot buffer zone should either file a Determination of Applicability or an NOI with the municipal conservation commission. Activities such as excavation of a riverbed would require the filing of an NOI under the Wetlands Protection Act.

The Massachusetts Waterways Act (Massachusetts General Law, Chapter 91) and regulations at 310 CMR 9.00 require that any work in or over any tidelands, river, or stream (with respect to which public funds have been expended), or great pond, or any outlet thereof, obtain a license from the Massachusetts Department of Environmental Protection (MADEP). Pursuant to Section 212(e) of SARA, permit requirements under the Chapter 91 Waterways License Agreement are waived for activities occurring on-site; however, compliance with the substantive standards must be achieved.

For activities that include dredging or filling of waters, or wetlands that require a MADEP Wetlands Order of Conditions, a Chapter 91 Waterways License, a USACE permit, or any major permit issued by EPA (e.g., CWA National Pollutant Discharge Elimination System permit), a Massachusetts Department of Water Pollution Control Water Quality Certification pursuant to 314 CMR 9.00 is applicable.

Regulations entitled "Certification for Dredging" and "Dredged Materials Disposal and Filling in Waters" are intended to encompass dredging projects in waters or wetland areas of the state that are also subject to the jurisdiction of either a federal agency under CWA (Section 401) or the Massachusetts Wetlands Act or Waterway Act. The regulations specify sampling methods and a classification system for dredge or fill material. Application forms may be required to be prepared and submitted for certification that the project will attain or maintain Massachusetts Water Quality Standards and minimize adverse impact to the environment.

The Environmental Affairs Coastal Zone Management (CZM) Program (301 CMR 20.00-22.00) established the Massachusetts CZM program under the federal Coastal Zone Management Act (15 CFR 930). These regulations are promulgated to establish CZM policies and to ensure that they are administered in a coordinated and consistent manner.

The federal act requires that any federal agency proposing to do work in a state's coastal zone must submit a plan outlining how all work to be performed is consistent with the state program. The Massachusetts CZM program policies are implemented with other state agencies (e.g., MADEP) through the standards and criteria of these agencies' regulations. Compliance with the Massachusetts CZM program will be met through attainment of MADEP location- and action-specific ARARs.

4.2.2.3 Action-specific ARARs

Action-specific ARARs are usually technology- or activity-based limitations that control actions at CERCLA sites. After remedial alternatives are developed, action-specific ARARs pertaining to proposed site remedies provide a basis for assessing the feasibility and effectiveness of the remedies. For example, these action-specific ARARs may include hazardous waste transportation and handling requirements, air and water emissions standards, and the TSCA and Resource Conservation and Recovery Act (RCRA) landfilling and treatment requirements. Potential action-specific ARARs, listed and summarized in Table 4-3, are discussed in the detailed evaluation of alternatives (see Section 7.0).

The Occupational Safety and Health Administration (OSHA) (29 CFR 19190, 1926) and Massachusetts "Right-to-Know" regulations are action-specific ARARs that apply to each alternative. On the federal level, OSHA is responsible for worker safety at CERCLA sites. These regulations set standards for exposure limits, safety training, protective equipment, and employer responsibility. At the state level, community and worker health and safety is protected by the Right-to-Know regulations promulgated by three agencies: MADEP (310 CMR 33.00), Department of Labor and Industry (454 CMR 21.00), and Department of Public Health (105 CMR 670.00). These rules require hazardous substance disclosure and are applicable to activities conducted during remediation of the estuary and the lower harbor/bay.

4.3 DEVELOPMENT OF TARGET CLEAN-UP LEVELS

TCLs are developed as part of the remedial action objectives. These levels identify contaminant concentrations in each medium of concern considered protective of human health and the environment. TCLs are either based on ARARs when available (i.e., surface water TCLs are set at AWQC) or developed based on exposure and risk considerations.

Public health TCLs were developed based on EPA guidelines and MCP requirements. EPA states that the total incremental carcinogenic risk for an individual resulting from exposure at a hazardous waste site should be between 10^{-4} and 10^{-6}. Therefore, remedial alternatives should reduce total potential carcinogenic risks to levels less than 10^{-4} (EPA, 1988). The MCP uses a total site carcinogenic risk level of 10^{-5} to evaluate the need for remediation at hazardous waste sites. For New Bedford Harbor, a risk level of 10^{-5} (one excess cancer event per 100,000 exposures) was selected to develop chemical-specific target levels for each medium of concern. This level is consistent with the MCP and the mid-point of the EPA target range. A risk level of 10^{-5} is considered to provide an adequate level of protection to human health.

For noncarcinogenic compounds, EPA uses an HI value of 1.0 to determine remedial actions at Superfund sites (EPA, 1988). The MCP uses an HI of 0.2 to evaluate noncarcinogenic risks. As

TABLE 4-3
POTENTIAL ACTION-SPECIFIC ARARS

ESTUARY AND LOWER HARBOR/BAY FEASIBILITY STUDY
NEW BEDFORD HARBOR, MASSACHUSETTS

ARARS	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARARS
RCRA - General Facility Standards (40 CFR 264.10 - 264.18)	General facility requirements outline general waste analysis, security measures, inspections, and training requirements.	Any facilities will be constructed, fenced, posted, and operated in accordance with this requirement. All workers will be properly trained. Process wastes will be evaluated for the characteristics of hazardous wastes to assess further landfilling requirements.
RCRA - Preparedness and Prevention (40 CFR 264.30 - 264.31)	This regulation outlines requirements for safety equipment and spill control.	Safety and communication equipment will be installed at the site; local authorities will be familiarized with site operations.
RCRA - Contingency Plan and Emergency Procedures (40 CFR 264.50 - 264.56)	This regulation outlines the requirements for emergency procedures to be used following explosions, fires, etc.	Plans will be developed and implemented during site work including installation of monitoring wells, and implementation of site remedies. Copies of the plans will be kept on-site.
RCRA - Releases from Solid Waste Management Units (40 CFR 264.90 - 264.109)	This regulation details requirements for a groundwater monitoring program to be installed at the site.	A groundwater monitoring program is a component of all alternatives. RCRA regulations will be utilized as guidance during development of this program.
RCRA - Closure and Post-closure (40 CFR 264.110 - 264.120)	This regulation details specific requirements for closure and post-closure of hazardous waste facilities.	Those parts of the regulation concerned with long-term monitoring and maintenance of the site will be incorporated into the design.
RCRA - Surface Impoundments Items (40 CFR 264.220 - 264.249)	This regulation details the design, construction, operation, monitoring, inspection, and contingency plans for a RCRA surface impoundment. Also provides three closure options for CERCLA sites; clean closure, containment closure, and alternate closure.	To comply with clean closure, owner must remove or decontaminate all waste. To comply with containment closure, the owner must eliminate free liquid, stabilize remaining waste, and cover impoundment with a cover that complies with the regulation. Integrity of cover must be maintained, groundwater system monitored, and runoff controlled. To comply with alternate closure, all pathways of exposure to contaminants must be eliminated and long-term monitoring provided.
RCRA - Waste Piles (40 CFR 264.250 - 264.269)	Details procedures, operating requirements, and closure and post-closure options for waste piles. If removal or decontamination of all contaminated subsoils is not possible, closure and post-closure requirements for landfills must be attained.	According to RCRA, waste piles used for treatment or storage of non-containerized accumulation of solid, non-flowing hazardous waste may comply with either the waste pile or landfill requirements. The temporary storage of solid waste on-site, therefore, must comply with one or the other subpart.
RCRA - Landfills (40 CFR 264.300 - 264.339)	This regulation details the design, operation, monitoring, inspection, recordkeeping, closure, and permit requirements for a RCRA landfill.	Disposal of contaminated materials from the harbor would be to a RCRA-permitted facility that complies with RCRA landfill regulations, including closure and post-closure. On-site disposal would include a RCRA-designed cap.

TABLE 4-3
(continued)
POTENTIAL ACTION-SPECIFIC ARARS

ESTUARY AND LOWER HARBOR/BAY FEASIBILITY STUDY
NEW BEDFORD HARBOR, MASSACHUSETTS

ARARS	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARARs
RCRA - Incinerators (40 CFR 264.340 - 264.599)	This regulation specifies the performance standards, operating requirements, monitoring, inspection, and closure guidelines of any incinerator burning hazardous waste.	On-site thermal treatment must comply with the appropriate requirements specified in this subpart of RCRA.
RCRA - Miscellaneous Units (40 CFR 264.600 - 264.999)	These standards are applicable to miscellaneous units not previously defined under existing RCRA regulations for treatment, storage, and disposal units.	Units not previously defined under RCRA must comply with these requirements.
TSCA Disposal Requirements (40 CFR Part 761.60)	PCBs at concentrations greater than 50 ppm, but less than 500 ppm, must be disposed of either in an incinerator, or in a chemical waste landfill, or by another technology capable of providing equal treatment. PCBs at concentrations greater than 500 ppm must be disposed of in an incinerator or treated by an alternate technology capable of equal treatment or disposed of in a chemical waste landfill. Dredged materials with PCB concentrations greater than 50 ppm may be disposed of by alternative methods which are protective of public health and the environment, if shown that incineration or disposal in a chemical waste landfill is not reasonable or appropriate.	PCB treatment must comply with these regulations during remedial action.
OSHA - General Industry Standards (29 CFR Part 1910)	These regulations specify the 8-hour time-weighted average concentration for various organic compounds. Training requirements for workers at hazardous waste operations are specified in 29 CFR 9910.120.	Proper respiratory equipment will be worn if it is impossible to maintain the work atmosphere below the specified concentrations. Workers performing remedial activities would be required to have completed specified training requirements.
OSHA - Safety and Health Standards (29 CFR Part 1926)	This regulation specifies the type of safety equipment and procedures to be followed during site remediation.	All appropriate safety equipment will be on-site. In addition, safety procedures will be followed during on-site activities.
OSHA - Recordkeeping, Reporting, and Related Regulations (29 CFR 1904)	This regulation outlines the recordkeeping and reporting requirements for an employer under OSHA.	These requirements apply to all site contractors and subcontractors and must be followed during all site work.
CWA - 40 CFR Part 403	This regulation specifies pretreatment standards for discharges to a publicly owned treatment works (POTW).	If a leachate collection system is installed and the discharge is sent to a POTW, the POTW must have an approved pretreatment program. The collected leachate runoff must be in compliance with the approved program. Prior to discharging, a report must be submitted containing identifying information, list of approved permits, description of operations, flow measurements, measurement of pollutants, certification by a qualified professional, and a compliance schedule.

TABLE 4-3
(continued)
POTENTIAL ACTION-SPECIFIC ARARS

ESTUARY AND LOWER HARBOR/BAY FEASIBILITY STUDY
NEW BEDFORD HARBOR, MASSACHUSETTS

ARARS	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARARS
Regulations on Disposal Site Determinations Under the Water Act (40 CFR 231)	These regulations apply to all existing, proposed, or potential disposal sites for discharges of dredged or fill material into U.S. waters, which include wetlands.	The dredged or fill material should not be discharged unless it can be demonstrated that such a discharge will not have an unacceptable adverse impact on the wetlands.
DOT Rules for Transportation of Hazardous Materials (49 CFR Parts 107, 171.1-171.5)	This regulation outlines procedures for the packaging, labeling, manifesting, and transporting of hazardous materials.	Contaminated materials will be packaged, manifested, and transported to a licensed off-site disposal facility in compliance with these regulations.
MADEP - Hazardous Waste Regulations, Phases I and II. (310 CMR 30.000, MGL Ch. ZIC)	This regulation provides a comprehensive program for the handling, storage, and recordkeeping at hazardous waste facilities. They supplement RCRA regulations.	Because these requirements supplement RCRA hazardous waste regulations, they must also be considered at New Bedford Harbor.
MADEP - Massachusetts Contingency Plan (310 CMR 40.000)	These regulations provide the framework for the Commonwealth of Massachusetts to regulate hazardous waste activities in the state.	During remedial design, these regulations will be compared to the corresponding federal CERCLA regulations, and the more stringent requirements will be applicable.
MADEP - Operation and Maintenance and Pretreatment Standards for Wastewater Treatment Works and Indirect Dischargers (314 CMR 12.00)	This regulation outlines the operation and maintenance requirements applicable to operators of wastewater treatment facilities. These rules require treatment to meet standards set forth in 314 CMR 3.00 and 5.00.	Operation of any treatment facilities on-site will be in accordance with the procedures and rules in this regulation.
MADEP - Massachusetts Surface Water Discharge Permit Program (314 CMR 1.00-7.00)	This section outlines the requirements for obtaining a National Pollutant Discharge Elimination System (NPDES) permit in Massachusetts.	Pollutant discharges to surface water must comply with NPDES permit requirements. Permit conditions and standards for different classes of water are specified.
MADEP - Supplemental Requirements for Hazardous Waste Management Facilities (314 CMR 8.00)	This regulation outlines the additional requirements that must be satisfied in order for a RCRA facility to comply with the NPDES regulations. These regulations are applicable to a water treatment unit; a surface impoundment that treats influent wastewater; and a POTW that generates, accumulates, and treats hazardous waste.	All owners and operators of RCRA facilities shall comply with the management standards of 310 CMR 30.500, the technical standards of 310 CMR 30.600, the location standards of 310 CMR 30.700, the financial responsibility requirements of 310 CMR 30.900, and in the case of POTWs, the standards for generators in 310 CRM 30.300.
Certification for Dredged Material Disposal and Filling in Waters (314 CMR 9.00)	This regulation is promulgated to establish procedures, criteria, and standards for the water quality certification of dredging and dredged material disposal.	Applications for proposed dredging/fill work need to be submitted and approved before work commences. Three categories have been established for dredge or fill material based on the chemical constituents. Approved methods for dredging, handling, and disposal options for the three categories must be met.

TABLE 4-3
(continued)
POTENTIAL ACTION-SPECIFIC ARARS

ESTUARY AND LOWER HARBOR/BAY FEASIBILITY STUDY
NEW BEDFORD HARBOR, MASSACHUSETTS

ARARS	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARARS
MADEP - Administration of Waterway License (310 CMR 9.00)	The rules were promulgated to establish procedures and criteria to protect public rights of fishing, fowling, and navigation in the marine and tidelands of the Commonwealth.	Design of capping and cover systems must be approved prior to construction. Dredging of sediment, and remedial activities conducted in tidal and saltwater areas need to comply with standards set forth in these rules.
EOEA - Coastal Zone Management (CZM) Program (301 CMR 20.00 - 22.00)	These regulations are promulgated to establish regulatory and non-regulatory CZM policies that include: #1 - protection of ecologically significant resource areas #3 - attainment of national water quality goals #5 - promote minimizing adverse effects from dredging and disposal of dredged material #10 - development in coastal zone areas complies with state and federal air and water pollution, and inland wetlands regulations.	These requirements will be attained through compliance with MADEP regulations: 310 CMR 6.00 Ambient Air Quality Standards 310 CMR 7.00 Air Pollution Control 310 CMR 9.00 Waterways Licenses 310 CMR 10.00 Wetlands Protection 310 CMR 19.00 Solid Waste Disposal 310 CMR 30.00 Hazardous Waste 314 CMR 9.00 Dredging
DPH - Right to Know (105 CMR 670)	This regulation establishes the Massachusetts Substance List. The goal of this regulation is to protect public health by providing information concerning hazardous substances.	This regulation will be attained during implementation of the remedial alternative by providing all workers with hazardous substance information.
MADEP - Disposal of Solid Waste by Sanitary Landfill (310 CMR 19.00)	This regulation establishes rules and requirements for solid waste disposal facilities.	Landfilling of screened, non-hazardous material will comply with this regulation.
MADEP - Right to Know (310 CMR 33.00)	This regulation establishes rules and requirements for the dissemination of information related to substances hazardous to the public.	This regulation will be attained during the implementation of the remedial alternative by providing the public with hazardous substance information.
DOI - Right to Know (441 CMR 21.00)	This regulation establishes requirements for worker "right to know."	This regulation will be attained during implementation of the remedial alternative by providing all workers with hazardous substance information.

discussed, the HI is the ratio of the expected dose of each contaminant to the most applicable health-based standard or criteria value. An HI of 1.0 implies that the incurred exposure dose does not exceed an exposure dose considered protective of human health.

For the New Bedford Harbor site, human health target levels are developed for the contaminants of concern that show a baseline carcinogenic risk exceeding 10^{-5} or noncarcinogenic risk greater than a total HI of 1.0 and 0.2. The TCLs are set at either a risk based value or chemical specific ARAR. Because there are no state or federal guidelines for developing ecological TCLs, these values were derived based on the risk assessment methodologies discussed in Section 3.0.

4.3.1 Human Health Target Clean-up Levels

The human health risks associated with contaminant exposure in the estuary and the lower harbor/bay result from direct contact and/or incidental ingestion of PCB- and lead-contaminated shoreline sediment and ingestion of PCB- and lead-contaminated biota. Exposures to metals and PCB concentrations in shoreline sediment are associated with carcinogenic and noncarcinogenic risks within and in excess of both EPA and Massachusetts target risk ranges (see Section 3.0). PCB concentrations in biota from this area exceed the current FDA tolerance level of 2 ppm PCB. There is no FDA tolerance level for lead, however, exposure to both contaminants is associated with risks in excess of state and federal guidance.

4.3.1.1 Human Health Target Clean-up Levels for Shoreline Sediments

Because there are no sediment-specific ARARs to use in developing clean-up levels, site-specific TCLs were developed based on the protection of human health. The TCLs are dveloped for PCB concentrations in shoreline sediments since exposure to contaminated mid-channel sediments is not considered likely. The population considered to be at greatest risk from contaminant exposure in the estuary, lower harbor, and bay is young children (through age 6). This population was identified based on land use and assumed activities of various age-class populations. Recreational land use in this area, in particular the state beaches, suggests that young children may have repetitive exposure to shoreline sediment. Therefore, to provide an adequate level of protection, TCLs for this study area were developed to be protective of assumed exposures by a child.

Two sets of sediment TCLs were developed: the first based on achieving the MCP criteria (total site incremental cancer risk of 10^{-5} and noncarcinogenic HI of 0.2); the second based on EPA's target risk range (incremental carcinogenic risk of 10^{-4}

to 10^{-6} and a noncarcinogenic HI of 1.0). Most of the exposure assumptions used in the baseline risk assessment under the probable exposure scenario were used to develop these TCLs, including the following:

- 10-kg child (through age 6)
- 20 exposures per year
- five-year exposure duration
- direct contact with 3.4 grams of sediment
- incidental ingestion of 0.1 gram of sediment
- 7 percent toxicokinetic factor (TKF) for PCBs; 0.1 percent for metals (dermal exposure)
- 100 percent TKF for PCBs and metals (oral exposure)

When the original exposure assumptions were developed by the REM III team in 1986, there were no standard exposure parameters developed for the ingestion of sediment; a value of 500 milligrams (mg) was assumed to provide a conservative estimate of potential exposure. Since 1986, EPA has proposed the use of 100 mg as the average amount of soil ingested per exposure event. EPA Region I and MADEP also recommended the use of this value in assessing the incidental ingestion of soil. Because no value specific to the ingestion of sediment has been proposed, the use of 100 mg sediment has been adopted. The TCLs developed for shoreline sediments using these exposure parameters are presented in Table 4-4.

4.3.1.2 Human Health Residual Tissue Levels for Biota

FFDCA Tolerance Levels for PCBs in fish and shellfish were developed by the FDA pursuant to Section 406 of the FFDCA (49[100]FR21514). A tolerance level of 2 ppm PCBs in the edible portion of fish and shellfish was established based on human health and food loss (e.g., economic) considerations.

The FDA tolerance level for PCBs is a chemical-specific ARARs and can be used to set residual tissue levels (RTL) of PCBs in biota. There is no FDA tolerance level for residues of lead in biota.

Although chemical-specific ARARs exist to evaluate PCB concentrations in biota, health-based residual tissue levels of PCBs and lead in biota were also developed for New Bedford Harbor. These values were established to be protective of the potential exposure incurred through the ingestion of any species of fish, by an adult (i.e., 18 to 70 years). This age class was considered most likely to ingest biota on a regular

TABLE 4-4
HUMAN HEALTH TARGET CLEAN-UP LEVELS FOR SEDIMENT

ESTUARY AND LOWER HARBOR/BAY
FEASIBILITY STUDY

	HAZARD INDEX	HAZARD INDEX	INCREMENTAL CANCER RISK
	0.2[a]	1[b]	10^{-5}[c]
PCBs	15 mg/kg	75 mg/kg	10 mg/kg
Cadmium	60 mg/kg	300 mg/kg	NA
Copper	4,400 mg/kg	22,000 mg/kg	NA
Lead	15 mg/kg	80 mg/kg	NA

NOTES:

[a]MADEP criteria for total site noncarcinogenic risk. The longer-term Health Advisory for PCBs of 0.0001 (mg/kg-day) was used to estimate noncarcinogenic risk.

[b]EPA criteria for noncarcinogenic risk

[c]MADEP criteria for total site carcinogenic risk; midpoint of EPA target risk range (10^{-6} to 10^{-4}). The cancer potency for PCBs of 7.7$(mg/kg\text{-}day)^{-1}$ was used to estimate carcinogenic risk.

NA = Not Applicable

mg/kg = milligrams per kilogram

MADEP = Massachusetts Department of Environmental Protection

EPA = U.S. Environmental Protection Agency

PCB = polychlorinated biphenyls

TCL = Target Clean-up Level

basis and ,therefore, be at greater risk of contaminant exposure. These RTLs are based only on potential health effects and, therefore, are more stringent than the FDA tolerance level.

Two sets of RTLs were developed; one based on MADEP and one based on EPA criteria (see Subsection 4.3.1). The same exposure assumptions used in the baseline risk assessment for the probable exposure scenario were the basis of these RTLs, including the following:

- o 70-kg adult
- o 12 exposures per year (one fish meal per month)
- o 55-year exposure duration (ages 15 through 70)
- o 227 grams of fish ingested per exposure (equivalent to 8 ounces)
- o 100 percent TKF for PCBs and lead

The RTLs for PCBs and lead in the edible portion of biota are presented in Table 4-5. These RTLs are applicable to the edible portion of any species of biota and, therefore, can be compared to the residual concentrations in lobster, winter flounder, clam, muscle, and/or crab from the New Bedford Harbor area. These health-based RTLs and the FDA tolerance level are used in subsequent sections to evaluate the long-term effectiveness of the various remedial alternatives.

4.3.2 Ecological Target Clean-up Levels

The ecological risks associated with contaminant exposure in the lower harbor/bay result from direct contact exposure to metals- and PCB-contaminated sediment and PCB-contaminated surface water. Because PCBs are lipophillic compounds, they tend to bioaccumulate within a food chain; therefore, elevated body burdens of these compounds may occur in higher trophic-level organisms. Concentrations of PCBs in the surface water of the lower harbor/bay exceed the chronic AWQC, and exposure to PCB and metals concentrations in sediments was associated with possible adverse ecological effects.

TCLs for PCBs in water and PCBs and metals in sediment were developed based on achieving an acceptable residual contaminant concentration in these media. The assumptions and methodologies used to derive these TCLs are discussed in the following subsection.

4.3.2.1 Ecological Target Clean-up Levels for Surface Water

TCLs for contaminants in surface water can be set at their respective chronic AWQC. These criteria were established by EPA

TABLE 4-5
HUMAN HEALTH RESIDUAL TISSUE LEVELS FOR BIOTA
(LOWER HARBOR/BAY)

ESTUARY AND LOWER HARBOR/BAY
FEASIBILITY STUDY

	Hazard Index	Hazard Index	Incremental Cancer Risk
	0.2[a]	1.0[b]	10^{-5}[c]
PCBs	0.2 mg/kg	1 mg/kg	0.02 mg/kg
Lead	0.26 mg/kg[d]	1.3 mg/kg[d]	--

NOTES:

[a]MADEP criteria for total site noncarcinogenic risk. The longer-term Health Advisory for PCBs of 0.0001 (mg/kg-day) was used to estimate noncarcinogenic risk.

[b]EPA criteria for noncarcinogenic risk

[c]MADEP criteria for total site carcinogenic risk; midpoint of EPA target range of 10^{-6} to 10^{-4}. The cancer potency factor for PCBs of 7.7$(mg/kg\text{-}day)^{-1}$ was used to estimate carcinogenic risk.

[d]The proposed MCL for lead (0.005 mg/L) was converted to units of (mg/kg-day) and used to establish TCLs.

NA = Not Applicable

mg/kg = milligrams per kilogram

MADEP = Massachusetts Department of Environmental Protection

EPA = U.S. Environmental Protection Agency

PCB = polychlorinated biphenyls

TCL = Target Clean-up Level

and are set at levels considered protective of aquatic receptors and/or their uses. AWQC are considered ARARs at this site. For the contaminants of concern at New Bedford Harbor, the TCLs are as follows:

Contaminant	Chronic AWQC
PCBs	0.03 ug/L
Cadmium	9.3 ug/L
Copper	2.9 ug/L
Lead	5.6 ug/L

PCB and copper concentrations in surface water in the estuary were detected in excess of their respective criteria. However, only PCB concentrations in surface water in the lower harbor/bay were detected in excess of its criterion.

4.3.2.2 Ecological Target Clean-up Levels for Sediment

Because there are no sediment-specific ARARs or established guidelines to use in developing clean-up levels, site-specific TCLs were developed based on the protection of aquatic biota. As discussed in Section 3.0, various methodologies exist to evaluate the effects of contaminant exposure on ecological systems. These include the EP, AET, SLC, and SQT approaches, which indicate that a sediment target level for PCBs between 0.1 and 1.0 ppm would likely be protective for most marine organisms. Further arguments for establishing a TCL within this range for the protection of ecological receptors are discussed in the following paragraphs.

As developed in the New Bedford Harbor Ecological Risk Assessment, the joint probability analysis methodology can be used to determine TCLs protective of the harbor ecosystem (E.C. Jordan Co./Ebasco, 1990a). The probabilities that particular taxa (e.g., marine fish, crustaceans, and mollusks) will experience chronic-level impacts can be evaluated by comparing the taxon-specific Maximum Acceptable Toxicant Concentration (MATC) distributions developed in the risk assessment with various sediment TCLs. Using this approach, approximately 5 and 25 percent of marine fish species are predicted to experience chronic-level impacts due to exposure to sediment pore water at PCB sediment TCLs of 0.1 and 1 ppm, respectively. The marine fish are considered the most sensitive taxa; therefore, other ecological receptors have lower probabilities of developing adverse chronic-level impacts at these TCLs.

The selection of a TCL between 0.1 and 1 ppm is also supported by results of the food-chain modeling performed by HydroQual. Predicted tissue levels in the modeled organisms inhabiting the upper estuary, estimated at 10 years after remediation of the upper estuary to 1 ppm, varied between 0.05 to 0.9 ppm (wet weight). For the winter flounder, <u>Pseudopleuronectes</u>

americanus, predicted levels varied between 0.2 and 0.5 ppm (wet weight). PCB concentrations as low as 0.2 ppm in the ovaries of the starry flounder was shown to be associated with effects on reproductive success (Spies et al., 1985). To allow comparisons between the HydroQual estimated whole-body concentrations and organ-specific toxicity data, it is necessary to adjust the estimated concentrations to account for differential accumulation in various fish tissues. BOS derived an edible whole-body ratio of 0.18 for winter flounder, and Ray found that the striped bass tend to accumulate PCBs in the gonadal tissue, with a ratio of muscle (edible) to gonad PCB concentrations ranging from 1:1 to 10:1 (Ray et al., 1984). Assuming the winter flounder whole-body tissue levels declined to 0.5 ppm after remediation, calculated gonadal tissue concentrations would fall between 0.065 and 0.65 ppm, using these values. Actual tissue PCB concentrations would likely be considerably lower than these estimates due to the fact that mature winter flounder migrate offshore, and only return to the estuary to spawn (Clayton, 1976).

4.4 DEVELOPMENT OF REMEDIAL ACTION OBJECTIVES

Remedial action objectives are established to minimize the human health and/or ecological risks associated with contamination in the sediment, surface water, and biota from the estuary and the lower harbor/bay. TCLs were developed to assist in determining appropriate remedial action objectives and clean-up goals. Because the sediments in New Bedford Harbor are the major source of PCB and metals contamination in all media, the remedial objectives for this site were focused on reducing contamination in this medium. Although PCB concentrations in surface water and biota were detected in excess of ARARs and/or health-based criteria, reducing PCB contaminant concentrations in sediments will result in concurrent reduction of contamination in surface water and biota. Therefore, specific remedial action objectives for surface water and biota were not developed.

In addition, while direct contact exposure to lead is associated with elevated human health risks, remedial action objectives were not developed specifically for reducing metals contamination in sediments. Concentrations of cadmium or copper in shoreline sediments from the estuary and the lower harbor/bay were below their respective human health TCLs (see Table 4-4). However, most of the reported lead concentrations exceed the human health TCL of 16 ppm.

Achieving a TCL for lead of 16 ppm may not be feasible at this site because of the location in an urban and industrialized area. Lead contamination in urban soil has been well documented. It has been estimated that soils adjacent to roadways have been enriched in lead by as much as 10,000 mg/kg soil; while in urban areas and in sites adjacent to smelters, as much as 130,000 mg/kg has been measured in the upper 2 to 5 cm of soil. The range of lead concentrations in shoreline sediments from the estuary and the lower harbor/bay is consistent with the levels of lead detected in urban and industrialized areas.

Because of potential general health hazards associated with exposure to lead, the Centers for Disease Control (CDC), EPA, and the Massachusetts Department of Public Health (MDPH) have established clean-up guidelines for lead-contaminated soils. The CDC cautions that concentrations of lead in soils and dust greater than 500 to 1,000 ppm could result in elevated blood levels in children inhaling or ingesting soils. EPA has established an interim soil clean-up level for lead in soils at 500 to 1,000 ppm, which the Office of Emergency and Remedial Response and the Office of Waste Program Enforcement consider protective for direct contact exposure in residential areas (EPA, 1989). In addition, MDPH, as part of its Lead Poisoning Prevention and Control Regulations, defines "dangerous levels of lead in soil" to be 1,000 ppm or greater of lead "in soils that pose a danger to a child under six years of age" (100 CMR460.000). Both the elevated concentrations of lead and likely exposure to young children are required under this definition.

Adopting the EPA interim soil clean-up level of 500 ppm as the TCL for lead in the estuary and the lower harbor/bay will provide an adequate level of protection to human health. This criterion is based on exposure to soils in residential areas, which are considered to occur more frequently than the potential exposures to sediments at New Bedford Harbor. The average lead concentration in shoreline sediments is approximately 110 ppm, which is below the interim clean-up level of 500 ppm lead proposed by EPA. Using the EPA target level, which is the same as the CDC and MDPH criteria, will provide consistency with other remediation efforts within Massachusetts and regions of the U.S.; however, it will not achieve an HI of 0.2 as required by the MCP, or an HI of 1.0 as suggested by EPA.

Site-specific TCLs for PCB concentrations in shoreline sediments were developed to be protective of direct contact and incidental ingestion exposure by a young child. The TCL of 10 ppm PCB is based on achieving an incremental carcinogenic risk level of 10^{-5}. The assumptions used in developing these TCLs are discussed in more detail in Section 4.3.1.1 and the TCLs are listed in Table 4-4.

In summary, a sediment TCL for PCBs of 10 ppm is recommended based on human health considerations for direct contact exposure and a sediment TCL for lead of 500 ppm is recommended based on the interim soil clean-up levels proposed by EPA, CDC, and MDPH.

Sediment TCLs for PCBs in the lower harbor/bay must also be set at a level considered protective of the environment. Results of the baseline ecological risk assessment identify PCBs as the contaminant of concern. Sediment TCLs developed for PCBs using the various methodologies discussed in Section 3.0 and Subsection 4.3.2.2 ranged from 0.1 to 1 ppm.

Achieving a residual sediment PCB concentration of 1 ppm may not be feasible at this site given the widespread distribution of PCBs in this area. The approximate area within the estuary and lower harbor containing sediments with greater than 1 ppm PCB is 960 acres (see Table 2-2). Extensive sediment sampling in the upper estuary shows that PCB concentrations between 1 and 10 ppm extend to a depth of 24 to 36 inches in this area (see Figure 2-3). It may not be feasible to remove and/or cap such a large volume/area of contaminated sediment.

Achieving a 1-ppm clean-up level through removal actions would require additional dredging and produce twice the amount of contaminated material that would be generated for a 10-ppm TCL. In addition, defining the 1-ppm PCB extent of contamination and accurately dredging to and maintaining a residual PCB concentration of 1 ppm is not known. Capping contaminated sediments to 1 ppm would involve a total area of approximately 960 acres. The feasibility of installing and maintaining an adequate cover material is also not known.

Achieving a TCL of 1 ppm PCB through either removal (e.g., dredging) or containment (e.g., capping) remedial actions will result in adverse environmental impacts. Of particular concern are the wetland areas located primarily along the eastern shoreline of the study area. Remediation of these sensitive habits would likely cause profound effects on the whole harbor ecosystem. Among the numerous functional services provided by wetland areas, the tremendous productivity is perhaps the most important; destruction of these areas would eliminate a significant contributor to the primary productivity that supports the harbor ecosystem. In addition, these areas play an essential role as refuge areas for juvenile fish, which spend many of the daylight hours hidden in the submergent vegetation, and then migrate into the open water at night to feed. (Juvenile fish suffer much greater predation risks when forced to remain in the open water during the day.) Many of these same submergent plants also serve as substrate for egg deposition by ovipositing females of many species. Finally, the vegetation in estuarine wetlands (particularly Spartin spp.) acts to trap sediments and to buffer the harbor from storm-related effects.

The mandated restoration of these wetlands would not result in the reestablishment of a similar community for many years; until then, the ecosystem would most likely be dramatically impaired. The large acreage involved indicates that any benefits accrued from dredging of these areas would be outweighed by the damage incurred.

Because a sediment TCL of 1 ppm is not considered technically feasible, a TCL of 10 ppm PCB is recommended as the remedial action objective for the estuary and the lower harbor/bay. This residual PCB sediment concentration provides an adequate level of protection to human health against direct contact and incidental ingestion exposure to PCBs. The potential adverse ecological impacts associated with this TCL cannot be determined at this time. However, the potential benefits obtained by remediation to 1 ppm are outweighed by the adverse ecological impacts associated with the extremely disruptive removal or containment actions necessary to achieve this TCL.
Figures 4-2 and 4-3 show the areas requiring remediation in the estuary and lower harbor/bay in order to achieve a TCL of 10 ppm.

4.5 REMEDIAL ACTION OBJECTIVES

The remedial action objectives for the Acushnet River Estuary, New Bedford Harbor, and Lower Harbor/Bay focus on the PCB-contaminated sediment remaining after remediation and/or containment of Hot Spot Area sediment. These objectives address an overall remedy for the entire New Bedford Harbor Superfund site.

Based on the TCLs discussed in Subsection 4.3, objectives were developed to serve as guidelines in choosing a remedial alternative that will reduce the human health and ecological risks posed by contamination in the study area. The response objectives are as follows:

- Prevent human exposure to contaminated shoreline sediment in excess of 10 ppm PCB and 500 ppm lead.
- Decrease exposure by ecological receptors to PCB-contaminated sediment in excess of 10 ppm.
- Reduce PCB-water column concentrations to AWQC (0.03 ug/L) by reducing PCB sediment concentrations to 10 ppm.
- Reduce PCB concentrations in biota to the FDA tolerance level (2 ppm) by reducing PCB sediment concentrations to 10 ppm.

In selecting alternatives to achieve these remedial objectives, SARA requires that alternatives use permanent solutions and innovative treatment technologies to the maximum extent practicable. In addition, preference should be given to alternatives that reduce the mobility, toxicity, or volume of

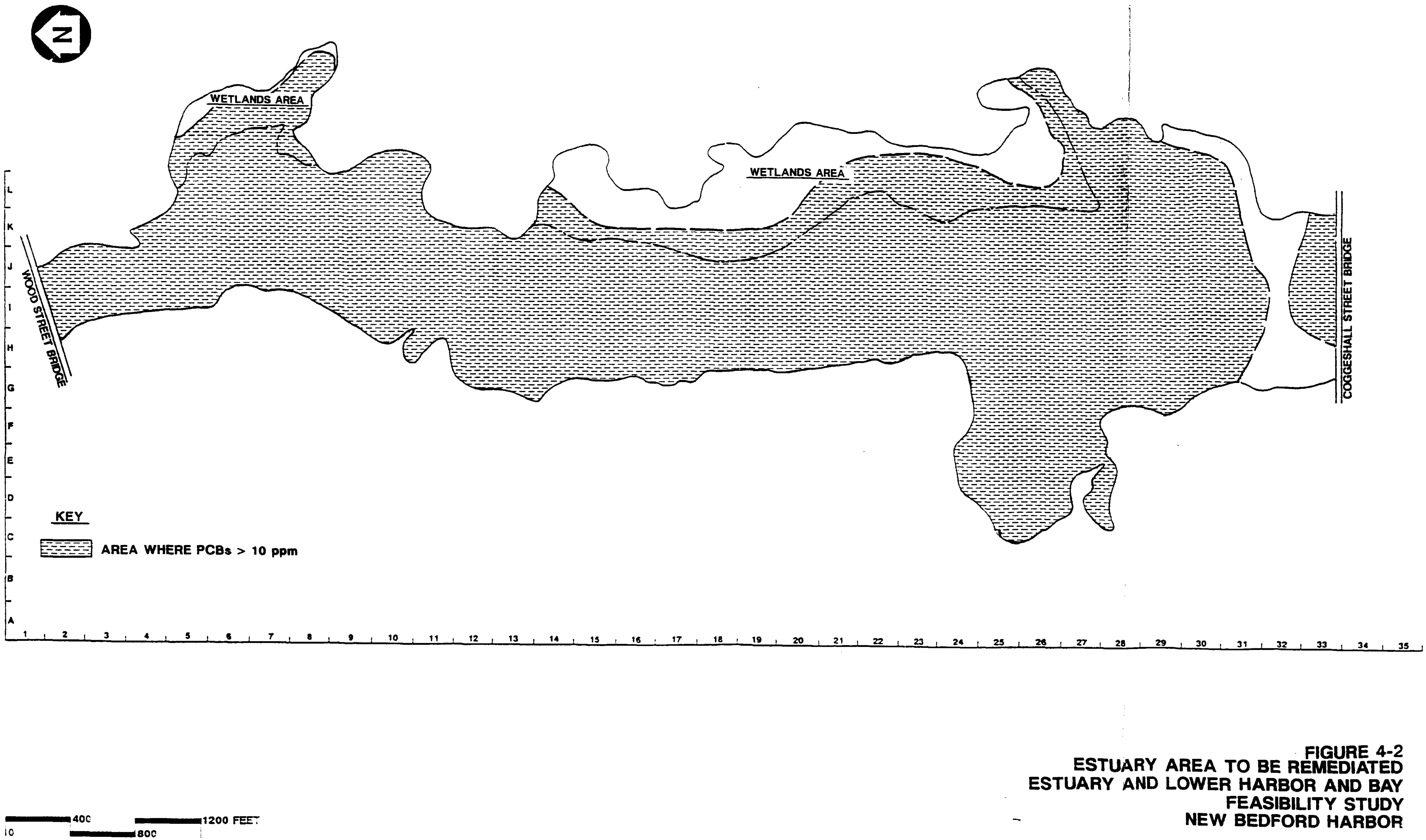

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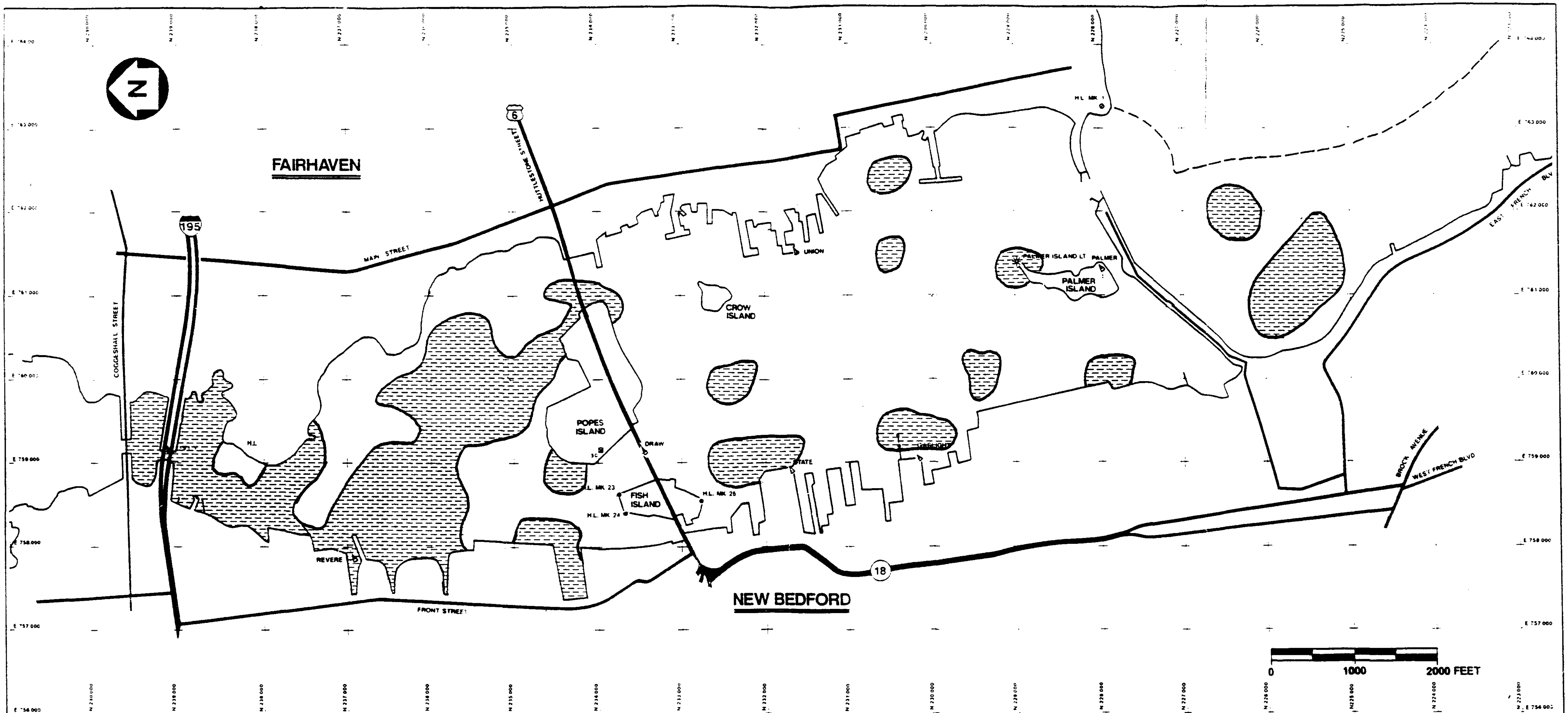
FIGURE 4-2
ESTUARY AREA TO BE REMEDIATED
ESTUARY AND LOWER HARBOR AND BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR



LEGEND

PCB CONCENTRATIONS OF > 10 ppm

FIGURE 4-3
LOWER HARBOR AND BAY AREAS TO BE REMEDIATED
ESTUARY AND LOWER HARBOR AND BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR

4959-25

the estuary and lower harbor/bay PCB-contaminated sediment. In this FS, reduction in mobility refers to the reduction in the mobility of contaminants as a function of physical or chemical treatment, not simply containment.

4.6 GENERAL RESPONSE ACTIONS

General response actions describe remedial actions that will satisfy the remedial action objectives. General response actions conceptualize potential remedial measures that may be used to address remedial action objectives, including containment, sediment removal, treatment, and institutional controls, or a combination of these options. General response actions lay the groundwork for identifying specific technologies, which are discussed in Section 5.0.

APPENDIX A

SEDIMENT ANALYTICAL DATA

GROUP 1 HOT SPOT SEDIMENT DATA

750> ty non_ecd_le.dat

LALALA T_T_T_ D M S	LOLOLO _D N_N_ M S	DATE_ SAMPLED	MA TE RI AL	FR AC TI ON	DE PT H_ T	DE PT H_ B	ORIG_ STATION	PARAMETER	CONC	UNITS	LAB_ID
		19850612	AM	AO	NA	NA	GUIT.PD	Lead	0.170000E+02	MG/KG	MAA502
		19850612	AM	AO	NA	NA	GUIT.PD	Copper	0.140000E+02	MG/KG	MAA502
		19850612	AM	AO	NA	NA	GUIT.PD	Lead	0.210000E+02	MG/KG	MAA503
		19850612	AM	AO	NA	NA	MILL PD	Lead	0.110000E+02	MG/KG	MAA504
		19850612	AM	AO	NA	NA	MILL PD	Lead	0.391000E+03	MG/KG	MAA505
		19850612	AM	AO	NA	NA	MILL PD	Copper	0.115000E+03	MG/KG	MAA505
		19850612	AM	AO	NA	NA	MILL PD	Lead	0.450000E+02	MG/KG	MAA506
		19850612	AM	AO	NA	NA	MILL PD	Copper	0.180000E+02	MG/KG	MAA506
413820	0705506	19850611	AM	AA	NA	NA	5	PCB - Aroclor 1254	0.140000E+04	UG/KG	AC305
413829	0705438	19850612	AM	AA	NA	NA	6	PCB - Aroclor 1254	0.138000E+03	UG/KG	AC306
413853	0705514	19850612	AM	AA	0	12	4	PCB - Aroclor 1254	0.371500E+04	UG/KG	AC308
413853	0705514	19850612	AM	AA	0	12	4	PCB - Aroclor 1242/1016	0.449000E+04	UG/KG	AC308
413853	0705514	19850612	AM	AA	12	24	4	PCB - Aroclor 1254	0.513000E+03	UG/KG	AC309
413853	0705514	19850612	AM	AA	12	24	4	PCB - Aroclor 1242/1016	0.469000E+03	UG/KG	AC309
413807	0705457	6111985	AM	AA	NA	NA	6	PCB - Aroclor 1254	0.130000E+04	UG/KG	AC312
413807	0705457	6111985	AM	AA	NA	NA	6	PCB - Aroclor 1242	0.440000E+04	UG/KG	AC312
413829	0705438	19850611	AM	AA	0	12	6	PCB - Aroclor 1254	0.285000E+03	UG/KG	AC313
413829	0705438	19850611	AM	AA	0	12	6	PCB - Aroclor 1242/1016	0.316000E+03	UG/KG	AC313
413821	0705507	6111985	AM	AA	NA	NA	5	PCB - Aroclor 1254	0.560000E+04	UG/KG	AC316
413821	0705507	6111985	AM	AA	NA	NA	5	PCB - Aroclor 1242	0.840000E+04	UG/KG	AC316
413820	0705506	19850611	AM	AA	0	12	5	PCB - Aroclor 1254	0.469000E+03	UG/KG	AC317
413820	0705506	19850611	AM	AA	0	12	5	PCB - Aroclor 1242/1016	0.512000E+03	UG/KG	AC317
413820	0705506	19850611	AM	AA	12	24	5	PCB - Aroclor 1254	0.391000E+03	UG/KG	AC318
413820	0705506	19850611	AM	AA	12	24	5	PCB - Aroclor 1242/1016	0.549000E+03	UG/KG	AC318
413820	0705506	19850611	AM	AA	48	NA	5	PCB - Aroclor 1254	0.161000E+03	UG/KG	AC321
413820	0705506	19850611	AM	AA	48	NA	5	PCB - Aroclor 1242/1016	0.190000E+03	UG/KG	AC321
413829	0705438	19850611	AM	AA	NA	NA	6	PCB - Aroclor 1254	0.270000E+04	UG/KG	AC332
413829	0705438	19850611	AM	AA	NA	NA	6	PCB - Aroclor 1242/1016	0.550000E+04	UG/KG	AC332
413807	0705456	19850612	AM	AA	NA	NA	7	PCB - Aroclor 1254	0.120000E+06	UG/KG	AC338
413807	0705456	19850612	AM	AA	NA	NA	7	PCB - Aroclor 1242/1016	0.190000E+06	UG/KG	AC338
413807	0705456	19850612	AM	AA	0	6	7	PCB - Aroclor 1254	0.210000E+06	UG/KG	AC339
413807	0705456	19850612	AM	AA	0	6	7	PCB - Aroclor 1242/1016	0.450000E+06	UG/KG	AC339
413807	0705456	19850612	AM	AA	6	12	7	PCB - Aroclor 1254	0.260000E+05	UG/KG	AC340
413807	0705456	19850612	AM	AA	6	12	7	PCB - Aroclor 1242/1016	0.900000E+04	UG/KG	AC340
413807	0705456	19850612	AM	AA	6	12	7	PCB - Aroclor 1254	0.240000E+05	UG/KG	AC341
413807	0705456	19850612	AM	AA	6	12	7	PCB - Aroclor 1242/1016	0.110000E+05	UG/KG	AC341
413807	0705456	19850612	AM	AA	18	24	7	PCB - Aroclor 1254	0.190000E+05	UG/KG	AC342
413807	0705456	19850612	AM	AA	18	24	7	PCB - Aroclor 1242/1016	0.150000E+05	UG/KG	AC342
413807	0705456	19850612	AM	AA	24	36	7	PCB - Aroclor 1254	0.540000E+04	UG/KG	AC343
413807	0705456	19850612	AM	AA	24	36	7	PCB - Aroclor 1242/1016	0.540000E+04	UG/KG	AC343
413807	0705456	19850612	AM	AA	30	NA	7	PCB - Aroclor 1254	0.842000E+03	UG/KG	AC344
413807	0705456	19850612	AM	AA	30	NA	7	PCB - Aroclor 1242/1016	0.734000E+03	UG/KG	AC344
413853	0705514	19850612	AM	AA	0	6	4	Lead	0.155400E+04	MG/KG	MAA507
413853	0705514	19850612	AM	AA	0	6	4	Cadmium	0.200000E+02	MG/KG	MAA507
413853	0705514	19850612	AM	AA	0	6	4	Copper	0.122200E+04	MG/KG	MAA507
413853	0705514	19850612	AM	AA	12	24	4	Lead	0.297000E+03	MG/KG	MAA508
413853	0705514	19850612	AM	AA	12	24	4	Copper	0.238000E+03	MG/KG	MAA508

413853	0705514	19850612	AM	AA	24	36	4	Lead	0.390000E+02	MG/KG	MAA510
413853	0705514	19850612	AM	AA	24	36	4	Lead	0.170000E+02	MG/KG	MAA511
413821	0705438	19850611	AM	AA	0	6	6	Lead	0.520000E+03	MG/KG	MAA512
413821	0705438	19850611	AM	AA	0	6	6	Copper	0.737000E+03	MG/KG	MAA512
413821	0705438	19850611	AM	AA	6	12	6	Lead	0.377000E+03	MG/KG	MAA513
413821	0705438	19850611	AM	AA	6	12	6	Copper	0.349000E+03	MG/KG	MAA513
413821	0705438	19850611	AM	AA	12	24	6	Lead	0.320000E+02	MG/KG	MAA514
413821	0705438	19850611	AM	AA	12	24	6	Copper	0.250000E+02	MG/KG	MAA514
413821	0705438	19850611	AM	AA	24	36	6	Lead	0.900000E+01	MG/KG	MAA515
413820	0705506	19850611	AM	AA	0	6	5	Lead	0.102000E+03	MG/KG	MAA516
413820	0705506	19850611	AM	AA	0	6	5	Cadmium	0.210000E+02	MG/KG	MAA516
413820	0705506	19850611	AM	AA	0	6	5	Copper	0.139000E+03	MG/KG	MAA516
413820	0705506	19850611	AM	AA	6	12	5	Lead	0.220000E+02	MG/KG	MAA517
413820	0705506	19850611	AM	AA	6	12	5	Copper	0.250000E+02	MG/KG	MAA517
413820	0705506	19850611	AM	AA	6	12	5	Lead	0.800000E+01	MG/KG	MAA518
413820	0705506	19850611	AM	AA	6	12	5	Copper	0.140000E+02	MG/KG	MAA518
413820	0705506	19850611	AM	AA	12	24	5	Lead	0.110000E+02	MG/KG	MAA519
413820	0705506	19850611	AM	AA	24	36	5	Lead	0.700000E+01	MG/KG	MAA520
413935	0705503	19850612	AM	AA	34	NA	2	PCB - Aroclor 1254	0.130000E+06	UG/KG	AC324
413935	0705503	19850612	AM	AA	34	NA	2	PCB - Aroclor 1242/1016	0.640000E+05	UG/KG	AC324
413935	0705503	19850612	AM	AA	24	36	2	PCB - Aroclor 1254	0.470000E+06	UG/KG	AC325
413935	0705503	19850612	AM	AA	24	36	2	PCB - Aroclor 1242/1016	0.200000E+06	UG/KG	AC325
413935	0705503	19850612	AM	AA	0	12	2	PCB - Aroclor 1254	0.540000E+06	UG/KG	AC326
413935	0705503	19850612	AM	AA	0	12	2	PCB - Aroclor 1242/1016	0.620000E+06	UG/KG	AC326
413936	0705503	6121985	AM	AA	NA	NA	2	PCB - Aroclor 1254	0.310000E+04	MG/KG	AC327
413936	0705503	6121985	AM	AA	NA	NA	2	PCB - Aroclor 1242	0.670000E+04	MG/KG	AC327
413914	0705505	19850612	AM	AA	12	24	3	PCB - Aroclor 1254	0.120000E+04	UG/KG	AC334
413914	0705505	19850612	AM	AA	12	24	3	PCB - Aroclor 1242/1016	0.200000E+05	UG/KG	AC334
413914	0705505	19850612	AM	AA	12	24	3	PCB - Aroclor 1254	0.130000E+04	UG/KG	AC335
413914	0705505	19850612	AM	AA	12	24	3	PCB - Aroclor 1242/1016	0.710000E+04	UG/KG	AC335
413914	0705505	19850612	AM	AA	0	12	3	PCB - Aroclor 1254	0.740000E+05	UG/KG	AC336
413914	0705505	19850612	AM	AA	0	12	3	PCB - Aroclor 1242/1016	0.720000E+05	UG/KG	AC336
413915	0705505	6111985	AM	AA	NA	NA	3	PCB - Aroclor 1254	0.360000E+06	UG/KG	AC337
413915	0705505	6111985	AM	AA	NA	NA	3	PCB - Aroclor 1242	0.180000E+04	MG/KG	AC337
413945	0705508	19850611	AM	AA	36	48		Lead	0.970000E+01	MG/KG	MAA521
413945	0705508	19850611	AM	AA	48	NA		Lead	0.840000E+01	MG/KG	MAA522
414027	0705457	6121985	AM	AA	NA	NA	1	PCB - Aroclor 1254	0.170000E+06	UG/KG	AC307
414027	0705457	6121985	AM	AA	NA	NA	1	PCB - Aroclor 1242	0.260000E+06	UG/KG	AC307
414027	0705457	6111985	AM	AA	NA	NA	1	PCB - Aroclor 1254	0.620000E+04	UG/KG	AC323
414027	0705457	6111985	AM	AA	NA	NA	1	PCB - Aroclor 1242	0.110000E+05	UG/KG	AC323
414027	0705457	19850611	AM	AA	0	12	1	PCB - Aroclor 1254	0.758000E+03	UG/KG	AC328
414027	0705457	19850611	AM	AA	0	12	1	PCB - Aroclor 1242/1016	0.868000E+03	UG/KG	AC328
414027	0705457	19850611	AM	AA	12	24	1	PCB - Aroclor 1254	0.160000E+03	UG/KG	AC329
414027	0705457	19850611	AM	AA	12	24	1	PCB - Aroclor 1242/1016	0.132000E+03	UG/KG	AC329
414027	0705457	19850611	AM	AA	NA	NA	1	PCB - Aroclor 1242/1016	0.700000E+02	UG/KG	AC331
414032	0705500	19850611	AM	AA	0	NA		Lead	0.176600E+04	MG/KG	MAA523
414032	0705500	19850611	AM	AA	0	NA		Cadmium	0.720000E+01	MG/KG	MAA523
414032	0705500	19850611	AM	AA	0	NA		Copper	0.101500E+04	MG/KG	MAA523
414025	0705506	19850611	AM	AA	24	NA		Lead	0.910000E+03	MG/KG	MAA524
414025	0705506	19850611	AM	AA	24	NA		Copper	0.701000E+03	MG/KG	MAA524
414025	0705506	19850611	AM	AA	12	24		Lead	0.891000E+03	MG/KG	MAA525
414025	0705506	19850611	AM	AA	12	24		Copper	0.730000E+03	MG/KG	MAA525
414025	0705506	19850611	AM	AA	NA	12		Lead	0.168000E+04	MG/KG	MAA526
414025	0705506	19850611	AM	AA	NA	12		Cadmium	0.230000E+02	MG/KG	MAA526
414025	0705506	19850611	AM	AA	NA	12		Copper	0.157700E+04	MG/KG	MAA526
414025	0705506	19850611	AM	AA	0	NA		Lead	0.188300E+04	MG/KG	MAA527
414025	0705506	19850611	AM	AA	0	NA		Cadmium	0.130000E+02	MG/KG	MAA527
414025	0705506	19850611	AM	AA	0	NA		Copper	0.979000E+03	MG/KG	MAA527
414032	0705500	19850611	AM	AA	NA	12		Lead	0.874000E+03	MG/KG	MAA528
414032	0705500	19850611	AM	AA	NA	12		Copper	0.539000E+03	MG/KG	MAA528
414032	0705500	19850611	AM	AA	12	24		Lead	0.344000E+03	MG/KG	MAA529
414032	0705500	19850611	AM	AA	12	24		Copper	0.288000E+03	MG/KG	MAA529
414032	0705500	19850611	AM	AA	24	36		Lead	0.104000E+03	MG/KG	MAA530
414032	0705500	19850611	AM	AA	24	36		Copper	0.370000E+02	MG/KG	MAA530
414032	0705500	19850611	AM	AA	36	NA		Lead	0.110000E+02	MG/KG	MAA531

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Copper	[illegible]	[illegible]	MAA533
414018	0705508	19850611	AM	AA	12	24	Lead	0.177000E+03	MG/KG	MAA534
414018	0705508	19850611	AM	AA	12	24	Copper	0.249000E+03	MG/KG	MAA534
414018	0705508	19850611	AM	AA	12	24	Lead	0.365000E+03	MG/KG	MAA535
414018	0705508	19850611	AM	AA	12	24	Copper	0.345000E+03	MG/KG	MAA535
414018	0705508	19850611	AM	AA	NA	12	Lead	0.369000E+03	MG/KG	MAA536
414018	0705508	19850611	AM	AA	NA	12	Cadmium	0.440000E+02	MG/KG	MAA536
414018	0705508	19850611	AM	AA	NA	12	Copper	0.348000E+03	MG/KG	MAA536
414018	0705508	19850611	AM	AA	0	NA	Lead	0.105500E+04	MG/KG	MAA537
414018	0705508	19850611	AM	AA	0	NA	Cadmium	0.330000E+02	MG/KG	MAA537
414018	0705508	19850611	AM	AA	0	NA	Copper	0.833000E+03	MG/KG	MAA537
414021	0705452	19850611	AM	AA	0	NA	Lead	0.893000E+03	MG/KG	MAA538
414021	0705452	19850611	AM	AA	0	NA	Cadmium	0.330000E+02	MG/KG	MAA538
414021	0705452	19850611	AM	AA	0	NA	Copper	0.174200E+04	MG/KG	MAA538
414021	0705452	19850611	AM	AA	NA	6	Lead	0.159200E+04	MG/KG	MAA539
414021	0705452	19850611	AM	AA	NA	6	Cadmium	0.190000E+02	MG/KG	MAA539
414021	0705452	19850611	AM	AA	NA	6	Copper	0.273100E+04	MG/KG	MAA539
414021	0705452	19850611	AM	AA	6	12	Lead	0.752000E+03	MG/KG	MAA540
414021	0705452	19850611	AM	AA	6	12	Copper	0.143100E+04	MG/KG	MAA540
414021	0705452	19850611	AM	AA	6	12	Lead	0.116100E+04	MG/KG	MAA541
414021	0705452	19850611	AM	AA	6	12	Copper	0.225400E+04	MG/KG	MAA541
414021	0705452	19850611	AM	AA	12	18	Lead	0.181000E+03	MG/KG	MAA542
414021	0705452	19850611	AM	AA	12	18	Copper	0.180000E+03	MG/KG	MAA542
414021	0705452	19850611	AM	AA	18	24	Lead	0.170000E+02	MG/KG	MAA543
414021	0705452	19850611	AM	AA	18	24	Copper	0.360000E+02	MG/KG	MAA543
414021	0705452	19850611	AM	AA	24	30	Lead	0.150000E+02	MG/KG	MAA544
414021	0705452	19850611	AM	AA	30	36	Lead	0.190000E+02	MG/KG	MAA545
414021	0705452	19850611	AM	AA	NA	NA	Lead	0.100000E+02	MG/KG	MAA546

7500 TY NBH_SED_AEI.DAT

LALALA T_T_T_ D M S	LONLOLO _D N_N_ M S	DATE_ SAMPLED	MA TE RI AL	FR AC TI ON	DE PT H_ T	DE PT H_ E	ORIG_ STATION	PARAMETER	CONC	UNITS	ORIG_ SAMPLE_ NUMBER
414015	0705509	oril 1987	AM	AA	0	12	12B/GB	PCB Total, nonspecific Aroc...	0.420000E+02	PPM	1658, 1657
414015	0705509	oril 1987	AM	AA	12	24	12B/GB	PCB Total, nonspecific Aroc...	0.000000E+00	PPM	1658, 1657
414016	0705507	oril 1987	AM	AA	0	12	12A/HA	PCB Total, nonspecific Aroc...	0.500000E+01	PPM	1660, 1659
414016	0705507	oril 1987	AM	AA	12	24	12A/HA	PCB Total, nonspecific Aroc...	0.000000E+00	PPM	1660, 1659
414014	0705507	oril 1987	AM	AA	0	12	13A/HA	PCB Total, nonspecific Aroc...	0.250000E+02	PPM	1662, 1661
414014	0705507	oril 1987	AM	AA	12	24	13A/HA	PCB Total, nonspecific Aroc...	0.000000E+00	PPM	1662, 1661
414012	0705507	oril 1987	AM	AA	0	12	13B/HA	PCB Total, nonspecific Aroc...	0.134500E+04	PPM	1664, 1663
414012	0705507	oril 1987	AM	AA	12	24	13B/HA	PCB Total, nonspecific Aroc...	0.000000E+00	PPM	1664, 1663
414014	0705505	oril 1987	AM	AA	0	12	13A/HB	PCB Total, nonspecific Aroc...	0.166700E+04	PPM	1666, 1665
414014	0705505	oril 1987	AM	AA	12	24	13A/HB	PCB Total, nonspecific Aroc...	0.000000E+00	PPM	1666, 1665
414015	0705505	oril 1987	AM	AA	0	12	12B/HB	PCB Total, nonspecific Aroc...	0.108300E+04	PPM	1668, 1667
414015	0705505	oril 1987	AM	AA	12	24	12B/HB	PCB Total, nonspecific Aroc...	0.000000E+00	PPM	1668, 1667
414016	0705505	oril 1987	AM	AA	0	12	12A/HB	PCB Total, nonspecific Aroc...	0.319900E+04	PPM	1670, 1669
414016	0705505	oril 1987	AM	AA	12	24	12A/HB	PCB Total, nonspecific Aroc...	0.000000E+00	PPM	1670, 1669
414017	0705505	oril 1987	AM	AA	0	12	11B/HB	PCB Total, nonspecific Aroc...	0.261900E+04	PPM	1672, 1671
414017	0705505	oril 1987	AM	AA	12	24	11B/HB	PCB Total, nonspecific Aroc...	0.600000E+00	PPM	1672, 1671
414019	0705505	oril 1987	AM	AA	0	12	11A/HB	PCB Total, nonspecific Aroc...	0.337100E+04	PPM	1674, 1673
414019	0705505	oril 1987	AM	AA	12	24	11A/HB	PCB Total, nonspecific Aroc...	0.128000E+03	PPM	1674, 1673
414019	0705503	oril 1987	AM	AA	0	12	11A/IA	PCB Total, nonspecific Aroc...	0.246520E+05	PPM	1676, 1675
414019	0705503	oril 1987	AM	AA	12	24	11A/IA	PCB Total, nonspecific Aroc...	0.290000E+01	PPM	1676, 1675
414019	0705502	oril 1987	AM	AA	0	12	11A/IB	PCB Total, nonspecific Aroc...	0.183660E+05	PPM	1678, 1677
414019	0705502	oril 1987	AM	AA	12	24	11A/IB	PCB Total, nonspecific Aroc...	0.105600E+04	PPM	1678, 1677
414017	0705502	oril 1987	AM	AA	0	12	11B/IB	PCB Total, nonspecific Aroc...	0.561400E+04	PPM	1680, 1679
414017	0705502	oril 1987	AM	AA	12	24	11B/IB	PCB Total, nonspecific Aroc...	0.354000E+03	PPM	1680, 1679
414021	0705504	oril 1987	AM	AA	0	12	10A/IA	PCB Total, nonspecific Aroc...	0.186600E+04	PPM	1682, 1681
414021	0705504	oril 1987	AM	AA	12	24	10A/IA	PCB Total, nonspecific Aroc...	0.000000E+00	PPM	1682, 1681
414021	0705502	oril 1987	AM	AA	0	12	10A/IB	PCB Total, nonspecific Aroc...	0.358800E+04	PPM	1684, 1683
414021	0705502	oril 1987	AM	AA	12	24	10A/IB	PCB Total, nonspecific Aroc...	0.220000E+01	PPM	1684, 1683
414020	0705502	oril 1987	AM	AA	0	12	10B/IB	PCB Total, nonspecific Aroc...	0.163100E+04	PPM	1686, 1685
414020	0705502	oril 1987	AM	AA	12	24	10B/IB	PCB Total, nonspecific Aroc...	0.800000E+01	PPM	1686, 1685
414015	0705503	oril 1987	AM	AA	0	12	12B/IA	PCB Total, nonspecific Aroc...	0.576200E+04	PPM	1688, 1687
414015	0705503	oril 1987	AM	AA	12	24	12B/IA	PCB Total, nonspecific Aroc...	0.201000E+03	PPM	1688, 1687
414017	0705504	oril 1987	AM	AA	0	12	11B/IA#1	PCB Total, nonspecific Aroc...	0.432400E+04	PPM	1690, 1689
414017	0705504	oril 1987	AM	AA	12	24	11B/IA#1	PCB Total, nonspecific Aroc...	0.310000E+02	PPM	1690, 1689
414017	0705504	oril 1987	AM	AA	0	12	11B/IA#2	PCB Total, nonspecific Aroc...	0.984200E+04	PPM	1692, 1691
414017	0705504	oril 1987	AM	AA	12	24	11B/IA#2	PCB Total, nonspecific Aroc...	0.500000E+00	PPM	1692, 1691
414018	0705503	oril 1987	AM	AA	0	12	11B/IA#3	PCB Total, nonspecific Aroc...	0.522300E+04	PPM	1694, 1693
414018	0705503	oril 1987	AM	AA	12	24	11B/IA#3	PCB Total, nonspecific Aroc...	0.900000E+01	PPM	1694, 1693
414017	0705503	oril 1987	AM	AA	0	12	11B/IA#4	PCB Total, nonspecific Aroc...	0.389200E+04	PPM	1696, 1695
414017	0705503	oril 1987	AM	AA	12	24	11B/IA#4	PCB Total, nonspecific Aroc...	0.200000E+01	PPM	1696, 1695
414016	0705504	oril 1987	AM	AA	0	12	12A/IA	PCB Total, nonspecific Aroc...	0.576000E+03	PPM	1698, 1697
414016	0705504	oril 1987	AM	AA	12	24	12A/IA	PCB Total, nonspecific Aroc...	0.600000E+00	PPM	1698, 1697
414021	0705505	oril 1987	AM	AA	0	12	10A/HB	PCB Total, nonspecific Aroc...	0.810000E+03	PPM	1710, 1709
414021	0705505	oril 1987	AM	AA	12	24	10A/HB	PCB Total, nonspecific Aroc...	0.000000E+00	PPM	1710, 1709
414020	0705505	oril 1987	AM	AA	0	12	10B/HB	PCB Total, nonspecific Aroc...	0.340000E+02	PPM	1712, 1711
414020	0705505	oril 1987	AM	AA	12	24	10B/HB	PCB Total, nonspecific Aroc...	0.380000E+02	PPM	1712, 1711
414022	0705500	oril 1987	AM	AA	0	12	9B/JA	PCB Total, nonspecific Aroc...	0.157500E+04	PPM	1714, 1713
414022	0705500	oril 1987	AM	AA	12	24	9B/JA	PCB Total, nonspecific Aroc...	0.302000E+03	PPM	1714, 1713
414021	0705501	oril 1987	AM	AA	0	12	10A/JA	PCB Total, nonspecific Aroc...	[illegible]	PPM	1716, 1715

[illegible]	[illegible]	oril 1987	AM AA	12 24	[illegible]/JA	PCB Total. nonspecific Aroc...	[illegible] PPM	1716, 1715
414020	0705[illegible]	oril 1987	AM AA	0 12	10B/JA	PCB Total. nonspecific Aroc...	[illegible]E+05 PPM	[illegible]
[illegible]	[illegible]	oril 1987	AM AA	12 24	10B/JA	PCB Total. nonspecific Aroc...	[illegible] PPM	[illegible]
414020	0705459	oril 1987	AM AA	0 12	10B/JB	PCB Total. nonspecific Aroc...	[illegible]E+04 PPM	[illegible], 1719
414020	0705459	oril 1987	AM AA	12 24	10B/JB	PCB Total. nonspecific Aroc...	[illegible]E+0[illegible] PPM	1720, 1719
414015	0705502	oril 1987	AM AA	0 12	12B/IB	PCB Total. nonspecific Aroc...	[illegible]3100E+04 PPM	1722, 1721
414015	0705502	oril 1987	AM AA	12 24	12B/IB	PCB Total. nonspecific Aroc...	0.900000E+01 PPM	1722, 1721
414014	0705502	oril 1987	AM AA	0 12	13A/IB	PCB Total. nonspecific Aroc...	0.901000E+03 PPM	1724, 1723
414014	0705502	oril 1987	AM AA	12 24	13A/IB	PCB Total. nonspecific Aroc...	0.000000E+00 PPM	1724, 1723
414014	0705504	oril 1987	AM AA	0 12	13A/IA	PCB Total. nonspecific Aroc...	0.169700E+04 PPM	1726, 1725
414014	0705504	oril 1987	AM AA	12 24	13A/IA	PCB Total. nonspecific Aroc...	0.000000E+00 PPM	1726, 1725
414013	0705504	oril 1987	AM AA	0 12	13B/IA	PCB Total. nonspecific Aroc...	0.182700E+04 PPM	1728, 1727
414013	0705504	oril 1987	AM AA	12 24	13B/IA	PCB Total. nonspecific Aroc...	0.000000E+00 PPM	1728, 1727
414030	0705500	oril 1987	AM AA	0 12	6B/JA	PCB Total. nonspecific Aroc...	0.870000E+02 PPM	1730, 1729
414030	0705500	oril 1987	AM AA	12 24	6B/JA	PCB Total. nonspecific Aroc...	0.000000E+00 PPM	1730, 1729
414029	0705500	oril 1987	AM AA	0 12	7A/JA	PCB Total. nonspecific Aroc...	0.343340E+05 PPM	1732, 1731
414029	0705500	oril 1987	AM AA	12 24	7A/JA	PCB Total. nonspecific Aroc...	0.450730E+05 PPM	1732, 1731
414027	0705501	oril 1987	AM AA	0 12	7B/JA	PCB Total. nonspecific Aroc...	0.160700E+04 PPM	1734, 1733
414027	0705501	oril 1987	AM AA	12 24	7B/JA	PCB Total. nonspecific Aroc...	0.270000E+01 PPM	1734, 1733
414026	0705502	oril 1987	AM AA	0 12	8A/IB	PCB Total. nonspecific Aroc...	0.616000E+03 PPM	1736, 1735
414026	0705502	oril 1987	AM AA	12 24	8A/IB	PCB Total. nonspecific Aroc...	0.630000E+01 PPM	1736, 1735
414024	0705502	oril 1987	AM AA	0 12	8B/IB	PCB Total. nonspecific Aroc...	0.227400E+04 PPM	1738, 1737
414024	0705502	oril 1987	AM AA	12 24	8B/IB	PCB Total. nonspecific Aroc...	0.560000E+01 PPM	1738, 1737
414025	0705500	oril 1987	AM AA	0 12	8B/JA	PCB Total. nonspecific Aroc...	0.438800E+04 PPM	1740, 1739
414025	0705500	oril 1987	AM AA	12 24	8B/JA	PCB Total. nonspecific Aroc...	0.124600E+04 PPM	1740, 1739
414024	0705501	oril 1987	AM AA	0 12	9A/JA	PCB Total. nonspecific Aroc...	0.127300E+04 PPM	1742, 1741
414024	0705501	oril 1987	AM AA	12 24	9A/JA	PCB Total. nonspecific Aroc...	0.000000E+00 PPM	1742, 1741
414024	0705459	oril 1987	AM AA	0 12	9A/JB	PCB Total. nonspecific Aroc...	0.814000E+03 PPM	1744, 1743
414024	0705459	oril 1987	AM AA	12 24	9A/JB	PCB Total. nonspecific Aroc...	0.000000E+00 PPM	1744, 1743
414024	0705459	oril 1987	AM AA	0 12	8B/JB	PCB Total. nonspecific Aroc...	0.623000E+03 PPM	1746, 1745
414024	0705459	oril 1987	AM AA	12 24	8B/JB	PCB Total. nonspecific Aroc...	0.000000E+00 PPM	1746, 1745
414026	0705459	oril 1987	AM AA	0 12	8A/JB	PCB Total. nonspecific Aroc...	0.404000E+04 PPM	1748, 1747
414026	0705459	oril 1987	AM AA	12 24	8A/JB	PCB Total. nonspecific Aroc...	0.000000E+00 PPM	1748, 1747
414027	0705459	oril 1987	AM AA	0 12	7B/JB	PCB Total. nonspecific Aroc...	0.231440E+05 PPM	1750, 1749
414027	0705459	oril 1987	AM AA	12 24	7B/JB	PCB Total. nonspecific Aroc...	0.282200E+04 PPM	1750, 1749
414028	0705459	oril 1987	AM AA	0 12	7A/JB#1	PCB Total. nonspecific Aroc...	0.716990E+05 PPM	1756, 1755
414028	0705459	oril 1987	AM AA	12 24	7A/JB#1	PCB Total. nonspecific Aroc...	0.193000E+03 PPM	1756, 1755
414029	0705459	oril 1987	AM AA	0 12	7A/JB#2	PCB Total. nonspecific Aroc...	0.731050E+05 PPM	1758, 1757
414029	0705459	oril 1987	AM AA	12 24	7A/JB#2	PCB Total. nonspecific Aroc...	0.273040E+05 PPM	1758, 1757
414029	0705459	oril 1987	AM AA	0 12	7A/JB#3	PCB Total. nonspecific Aroc...	0.663140E+05 PPM	1760, 1759
414029	0705459	oril 1987	AM AA	12 24	7A/JB#3	PCB Total. nonspecific Aroc...	0.422770E+05 PPM	1760, 1759
414029	0705459	oril 1987	AM AA	0 12	7A/JB#4	PCB Total. nonspecific Aroc...	0.102099E+06 PPM	1762, 1761
414029	0705459	oril 1987	AM AA	12 24	7A/JB#4	PCB Total. nonspecific Aroc...	0.113860E+05 PPM	1762, 1761
414030	0705459	oril 1987	AM AA	0 12	6B/JB	PCB Total. nonspecific Aroc...	0.559900E+04 PPM	1764, 1763
414030	0705459	oril 1987	AM AA	12 24	6B/JB	PCB Total. nonspecific Aroc...	0.120000E+02 PPM	1764, 1763

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GROUP 2 USACE WETLANDS SEDIMENT DATA

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LALALA T_T_T_ D M S	LONLOLO _D N_N_ M S	DATE_ SAMPLED	MATERIAL	FRACTION	DEPTH_T	DEPTH_B	ORIG_ STATION	PARAMETER	CONC	UNITS	LAB_ID
		19851005	AM	AA	12	24	53274	PCB - Aroclor 1254	0.110000E+04	UG/KG	AD562
		10051985	AM	AA	0	12	M-8-0-1	PCB - Aroclor 1254	0.160000E+05	UG/KG	AD567
			AM	AA	12	24	M-8	Lead	0.760000E+01	MG/KG	MAB760
			AM	AA	12	24	M-8	Copper	0.150000E+02	MG/KG	MAB760
			AM	AA	0	12	M-8	Lead	0.720000E+02	MG/KG	MAB761
			AM	AA	0	12	M-8	Copper	0.760000E+02	MG/KG	MAB761
			AM	AO	NA	NA		PCB - Aroclor 1248/1260	0.100000E+00	PPM DW	0101A-D
			AM	AO	NA	NA		Lead	0.260000E+02	PPM DW	0101A-D
			AM	AO	NA	NA		Cadmium	0.200000E+01	PPM DW	0101A-D
			AM	AO	NA	NA		Copper	0.110000E+02	PPM DW	0101A-D
			AM	AO	NA	NA		PCB - Aroclor 1248/1260	0.400000E-01	PPM DW	0161A-E
			AM	AO	NA	NA		Lead	0.160000E+02	PPM DW	0161A-E
			AM	AO	NA	NA		Cadmium	0.200000E+01	PPM DW	0161A-E
			AM	AO	NA	NA		Copper	0.110000E+02	PPM DW	0161A-E
413928	0705503	8211985	AM	AA	0	8	I-31	PCB - Aroclor 1248/1260	0.224000E+02	PPM DW	9778A
413928	0705503	8211985	AM	AA	0	8	I-31	Lead	0.111000E+03	PPM DW	9778A
413928	0705503	8211985	AM	AA	0	8	I-31	Cadmium	0.700000E+01	PPM DW	9778A
413928	0705503	8211985	AM	AA	0	8	I-31	Copper	0.397000E+03	PPM DW	9778A
413928	0705503	8211985	AM	AA	8	24	I-31	PCB - Aroclor 1248/1260	0.270000E+00	PPM DW	9778B
413928	0705503	8211985	AM	AA	8	24	I-31	Lead	0.000000E+00	PPM DW	9778B
413928	0705503	8211985	AM	AA	8	24	I-31	Cadmium	0.000000E+00	PPM DW	9778B
413928	0705503	8211985	AM	AA	8	24	I-31	Copper	0.700000E+01	PPM DW	9778B
413958	0705503	8221985	AM	AA	0	13	I-19	PCB - Aroclor 1248/1260	0.911000E+03	PPM DW	9786A
413958	0705503	8221985	AM	AA	0	13	I-19	Lead	0.507000E+03	PPM DW	9786A
413958	0705503	8221985	AM	AA	0	13	I-19	Cadmium	0.550000E+02	PPM DW	9786A
413958	0705503	8221985	AM	AA	0	13	I-19	Copper	0.156000E+04	PPM DW	9786A
413958	0705503	8221985	AM	AA	24	37	I-19	PCB - Aroclor 1248/1260	0.000000E+00	PPM DW	9786C
413958	0705503	8221985	AM	AA	24	37	I-19	Lead	0.000000E+00	PPM DW	9786C
413958	0705503	8221985	AM	AA	24	37	I-19	Cadmium	0.000000E+00	PPM DW	9786C
413958	0705503	8221985	AM	AA	24	37	I-19	Copper	0.000000E+00	PPM DW	9786C
413948	0705503	8271985	AM	AA	0	24	I-23	PCB - Aroclor 1248/1260	0.441000E+03	PPM DW	9840A
413948	0705503	8271985	AM	AA	0	24	I-23	Lead	0.806000E+03	PPM DW	9840A
413948	0705503	8271985	AM	AA	0	24	I-23	Cadmium	0.600000E+02	PPM DW	9840A
413948	0705503	8271985	AM	AA	0	24	I-23	Copper	0.247000E+04	PPM DW	9840A
413948	0705503	8271985	AM	AA	24	36	I-23	PCB - Aroclor 1248/1260	0.340000E+00	PPM DW	9840B
413948	0705503	8271985	AM	AA	24	36	I-23	Lead	0.362000E+03	PPM DW	9840B
413948	0705503	8271985	AM	AA	24	36	I-23	Cadmium	0.000000E+00	PPM DW	9840B
413948	0705503	8271985	AM	AA	24	36	I-23	Copper	0.595000E+03	PPM DW	9840B
413935	0705503	8271985	AM	AA	0	12	I-28	PCB - Aroclor 1248/1260	0.177000E+03	PPM DW	9848A
413935	0705503	8271985	AM	AA	0	12	I-28	Lead	0.529000E+03	PPM DW	9848A
413935	0705503	8271985	AM	AA	0	12	I-28	Cadmium	0.190000E+02	PPM DW	9848A
413935	0705503	8271985	AM	AA	0	12	I-28	Copper	0.203000E+04	PPM DW	9848A
413935	0705503	8271985	AM	AA	24	38	I-28	PCB - Aroclor 1248/1260	0.200000E-01	PPM DW	9848C
413935	0705503	8271985	AM	AA	24	38	I-28	Lead	0.202000E+03	PPM DW	9848C
413935	0705503	8271985	AM	AA	24	38	I-28	Cadmium	0.000000E+00	PPM DW	9848C
413935	0705503	8271985	AM	AA	24	38	I-28	Copper	0.212000E+03	PPM DW	9848C
413924	0705506	8281985	AM	AA	24	36	H-33	PCB - Aroclor 1248/1260	0.400000E-01	PPM DW	9858C
413924	0705506	8281985	AM	AA	24	36	H-33	Lead	0.000000E+00	PPM DW	9858C
413924	0705506	8281985	AM	AA	24	36	H-33	Cadmium	[illegible]	[illegible]	[illegible]

[illegible]	[illegible]	[illegible]	AM	AA	24	[illegible]	[illegible]	Copper	[illegible]	PPM	DW	[illegible]
[illegible]	[illegible]	[illegible]	AM	AA	0	12	H-33	PCB - Aroclor 1248/1260	[illegible]	PPM	DW	[illegible]
413924	[illegible]	8281985	AM	AA	0	12	H-33	Lead	[illegible]	PPM	DW	[illegible]
413924	0705506	8281985	AM	AA	0	12	H-33	Cadmium	[illegible]	PPM	DW	9859A
413924	0705506	8281985	AM	AA	0	12	H-33	Copper	[illegible]	PPM	DW	9859A
413953	0705506	8291985	AM	AA	0	12	H-21	PCB - Aroclor 1248/1260	[illegible]	PPM	DW	9869A
413953	0705506	8291985	AM	AA	0	12	H-21	Lead	0.751000E+03	PPM	DW	9869A
413953	0705506	8291985	AM	AA	0	12	H-21	Cadmium	0.510000E+02	PPM	DW	9869A
413953	0705506	8291985	AM	AA	0	12	H-21	Copper	0.183000E+04	PPM	DW	9869A
413953	0705506	8291985	AM	AA	12	24	H-21	PCB - Aroclor 1248/1260	0.204000E+01	PPM	DW	9869B
413953	0705506	8291985	AM	AA	12	24	H-21	Lead	0.254000E+03	PPM	DW	9869B
413953	0705506	8291985	AM	AA	12	24	H-21	Cadmium	0.000000E+00	PPM	DW	9869B
413953	0705506	8291985	AM	AA	12	24	H-21	Copper	0.259000E+03	PPM	DW	9869B
413953	0705506	8291985	AM	AA	24	37	H-21	PCB - Aroclor 1248/1260	0.190000E+00	PPM	DW	9869C
413953	0705506	8291985	AM	AA	24	37	H-21	Lead	0.390000E+02	PPM	DW	9869C
413953	0705506	8291985	AM	AA	24	37	H-21	Cadmium	0.000000E+00	PPM	DW	9869C
413953	0705506	8291985	AM	AA	24	37	H-21	Copper	0.580000E+02	PPM	DW	9869C
413943	0705506	9051985	AM	AA	0	12	H-25	PCB - Aroclor 1248/1260	0.160000E+03	PPM	DW	9907A
413943	0705506	9051985	AM	AA	0	12	H-25	Lead	0.558000E+03	PPM	DW	9907A
413943	0705506	9051985	AM	AA	0	12	H-25	Cadmium	0.700000E+02	PPM	DW	9907A
413943	0705506	9051985	AM	AA	0	12	H-25	Copper	0.178000E+04	PPM	DW	9907A
413943	0705506	9051985	AM	AA	24	33	H-25	PCB - Aroclor 1248/1260	0.160000E+00	PPM	DW	9907C
413943	0705506	9051985	AM	AA	24	33	H-25	Lead	0.000000E+00	PPM	DW	9907C
413943	0705506	9051985	AM	AA	24	33	H-25	Cadmium	0.000000E+00	PPM	DW	9907C
413943	0705506	9051985	AM	AA	24	33	H-25	Copper	0.000000E+00	PPM	DW	9907C
413943	0705516	9101985	AM	AA	0	12	E-25-1	PCB - Aroclor 1248/1260	0.907000E+02	PPM	DW	9910A
413943	0705516	9101985	AM	AA	0	12	E-25-1	Lead	0.434000E+03	PPM	DW	9910A
413943	0705516	9101985	AM	AA	0	12	E-25-1	Cadmium	0.160000E+02	PPM	DW	9910A
413943	0705516	9101985	AM	AA	0	12	E-25-1	Copper	0.897000E+03	PPM	DW	9910A
413943	0705516	9101985	AM	AA	12	24	E-25-1	PCB - Aroclor 1248/1260	0.228000E+01	PPM	DW	9910B
413943	0705516	9101985	AM	AA	12	24	E-25-1	Lead	0.539000E+03	PPM	DW	9910B
413943	0705516	9101985	AM	AA	12	24	E-25-1	Cadmium	0.700000E+01	PPM	DW	9910B
413943	0705516	9101985	AM	AA	12	24	E-25-1	Copper	0.748000E+03	PPM	DW	9910B
413943	0705516	9101985	AM	AA	24	30	E-25-1	PCB - Aroclor 1248/1260	0.210000E+00	PPM	DW	9910C
413943	0705516	9101985	AM	AA	24	30	E-25-1	Lead	0.000000E+00	PPM	DW	9910C
413943	0705516	9101985	AM	AA	24	30	E-25-1	Cadmium	0.000000E+00	PPM	DW	9910C
413943	0705516	9101985	AM	AA	24	30	E-25-1	Copper	0.000000E+00	PPM	DW	9910C
413938	0705516	9101985	AM	AA	0	24	E-27-1	PCB - Aroclor 1248/1260	0.267000E+02	PPM	DW	9912A
413938	0705516	9101985	AM	AA	0	24	E-27-1	Lead	0.183000E+03	PPM	DW	9912A
413938	0705516	9101985	AM	AA	0	24	E-27-1	Cadmium	0.120000E+02	PPM	DW	9912A
413938	0705516	9101985	AM	AA	0	24	E-27-1	Copper	0.392000E+03	PPM	DW	9912A
413938	0705516	9101985	AM	AA	24	33	E-27-1	PCB - Aroclor 1248/1260	0.110000E+01	PPM	DW	9912B
413938	0705516	9101985	AM	AA	24	33	E-27-1	Lead	0.270000E+02	PPM	DW	9912B
413938	0705516	9101985	AM	AA	24	33	E-27-1	Cadmium	0.000000E+00	PPM	DW	9912B
413938	0705516	9101985	AM	AA	24	33	E-27-1	Copper	0.360000E+02	PPM	DW	9912B
413955	0705507	9141985	AM	AA	0	12	B-20-2	PCB - Aroclor 1248/1260	0.126000E+02	PPM	DW	9921A
413955	0705507	9141985	AM	AA	0	12	B-20-2	Lead	0.470000E+03	PPM	DW	9921A
413955	0705507	9141985	AM	AA	0	12	B-20-2	Cadmium	0.900000E+01	PPM	DW	9921A
413955	0705507	9141985	AM	AA	0	12	B-20-2	Copper	0.612000E+03	PPM	DW	9921A
413955	0705507	9141985	AM	AA	24	36	B-20-2	PCB - Aroclor 1248/1260	0.290000E+00	PPM	DW	9921C
413955	0705507	9141985	AM	AA	24	36	B-20-2	Lead	0.000000E+00	PPM	DW	9921C
413955	0705507	9141985	AM	AA	24	36	B-20-2	Cadmium	0.000000E+00	PPM	DW	9921C
413955	0705507	9141985	AM	AA	24	36	B-20-2	Copper	0.900000E+01	PPM	DW	9921C
413934	0705508	9101985	AM	AA	0	15	B-29-1	PCB - Aroclor 1248/1260	0.226000E+02	PPM	DW	9922A
413934	0705508	9101985	AM	AA	0	15	B-29-1	Lead	0.216000E+03	PPM	DW	9922A
413934	0705508	9101985	AM	AA	0	15	B-29-1	Cadmium	0.110000E+02	PPM	DW	9922A
413934	0705508	9101985	AM	AA	0	15	B-29-1	Copper	0.360000E+03	PPM	DW	9922A
413934	0705508	9101985	AM	AA	15	27	B-29-1	PCB - Aroclor 1248/1260	0.550000E+00	PPM	DW	9922B
413934	0705508	9101985	AM	AA	15	27	B-29-1	Lead	0.000000E+00	PPM	DW	9922B
413934	0705508	9101985	AM	AA	15	27	B-29-1	Cadmium	0.000000E+00	PPM	DW	9922B
413934	0705508	9101985	AM	AA	15	27	B-29-1	Copper	0.160000E+02	PPM	DW	9922B
413955	0705500	9141985	AM	AA	0	16	J-20-2	PCB - Aroclor 1248/1260	0.234000E+01	PPM	DW	9947A
413955	0705500	9141985	AM	AA	0	16	J-20-2	Lead	0.000000E+00	PPM	DW	9947A
413955	0705500	9141985	AM	AA	0	16	J-20-2	Cadmium	0.000000E+00	PPM	DW	9947A
413955	0705500	9141985	AM	AA	0	16	J-20-2	Copper	0.380000E+02	PPM	DW	9947A

413941	0705457	9121985	AM	AA	0	12	K-26-1	Lead	0.480000E+02	PPM DW	9950A
413941	0705457	9121985	AM	AA	0	12	K-26-1	Cadmium	0.000000E+00	PPM DW	9950A
413941	0705457	9121985	AM	AA	0	12	K-26-1	Copper	0.189000E+03	PPM DW	9950A
413941	0705457	9121985	AM	AA	12	22	K-26-1	PCB - Aroclor 1248/1260	0.400000E-01	PPM DW	9950B
413941	0705457	9121985	AM	AA	12	22	K-26-1	Lead	0.000000E+00	PPM DW	9950B
413941	0705457	9121985	AM	AA	12	22	K-26-1	Cadmium	0.000000E+00	PPM DW	9950B
413941	0705457	9121985	AM	AA	12	22	K-26-1	Copper	0.000000E+00	PPM DW	9950B
413936	0705457	9121985	AM	AA	0	8	K-28-2	PCB - Aroclor 1248/1260	0.165000E+02	PPM DW	9953A
413936	0705457	9121985	AM	AA	0	8	K-28-2	Lead	0.410000E+02	PPM DW	9953A
413936	0705457	9121985	AM	AA	0	8	K-28-2	Cadmium	0.000000E+00	PPM DW	9953A
413936	0705457	9121985	AM	AA	0	8	K-28-2	Copper	0.114000E+03	PPM DW	9953A
413936	0705457	9121985	AM	AA	8	20	K-28-2	PCB - Aroclor 1248/1260	0.600000E-01	PPM DW	9953B
413936	0705457	9121985	AM	AA	8	20	K-28-2	Lead	0.000000E+00	PPM DW	9953B
413936	0705457	9121985	AM	AA	8	20	K-28-2	Cadmium	0.000000E+00	PPM DW	9953B
413936	0705457	9121985	AM	AA	8	20	K-28-2	Copper	0.000000E+00	PPM DW	9953B
413925	0705457	9121985	AM	AA	0	12	K-32-1	PCB - Aroclor 1248/1260	0.256000E-01	PPM DW	9954A
413925	0705457	9121985	AM	AA	0	12	K-32-1	Lead	0.000000E+00	PPM DW	9954A
413925	0705457	9121985	AM	AA	0	12	K-32-1	Cadmium	0.000000E+00	PPM DW	9954A
413925	0705457	9121985	AM	AA	0	12	K-32-1	Copper	0.000000E+00	PPM DW	9954A
413925	0705457	9121985	AM	AA	12	23	K-32-1	PCB - Aroclor 1248/1260	0.200000E-01	PPM DW	9954B
413925	0705457	9121985	AM	AA	12	23	K-32-1	Lead	0.000000E+00	PPM DW	9954B
413925	0705457	9121985	AM	AA	12	23	K-32-1	Cadmium	0.000000E+00	PPM DW	9954B
413925	0705457	9121985	AM	AA	12	23	K-32-1	Copper	0.000000E+00	PPM DW	9954B
413933	0705453	9151985	AM	AA	0	12	L-29-2	PCB - Aroclor 1248/1260	0.291000E+02	PPM DW	9962A
413933	0705453	9151985	AM	AA	0	12	L-29-2	Lead	0.000000E+00	PPM DW	9962A
413933	0705453	9151985	AM	AA	0	12	L-29-2	Cadmium	0.000000E+00	PPM DW	9962A
413933	0705453	9151985	AM	AA	0	12	L-29-2	Copper	0.153000E+03	PPM DW	9962A
413933	0705453	9151985	AM	AA	24	36	L-29-2	PCB - Aroclor 1248/1260	0.600000E-01	PPM DW	9962C
413933	0705453	9151985	AM	AA	24	36	L-29-2	Lead	0.000000E+00	PPM DW	9962C
413933	0705453	9151985	AM	AA	24	36	L-29-2	Cadmium	0.000000E+00	PPM DW	9962C
413933	0705453	9151985	AM	AA	24	36	L-29-2	Copper	0.100000E+02	PPM DW	9962C
413939	0705701	9111985	AM	AA	0	16	M-27-1	PCB - Aroclor 1248/1260	0.518000E+02	PPM DW	9967A
413939	0705701	9111985	AM	AA	0	16	M-27-1	Lead	0.151000E+03	PPM DW	9967A
413939	0705701	9111985	AM	AA	0	16	M-27-1	Cadmium	0.300000E+01	PPM DW	9967A
413939	0705701	9111985	AM	AA	0	16	M-27-1	Copper	0.227000E+03	PPM DW	9967A
413939	0705701	9111985	AM	AA	16	26	M-27-1	PCB - Aroclor 1248/1260	0.200000E-01	PPM DW	9967B
413939	0705701	9111985	AM	AA	16	26	M-27-1	Lead	0.000000E+00	PPM DW	9967B
413939	0705701	9111985	AM	AA	16	26	M-27-1	Cadmium	0.000000E+00	PPM DW	9967B
413939	0705701	9111985	AM	AA	16	26	M-27-1	Copper	0.000000E+00	PPM DW	9967B
413939	0705454	19850915	AM	AA	24	36	L2703	PCB - Aroclor 1254	0.390000E+03	UG/KG	AD557
413939	0705454	9151985	AM	AA	0	12	L-27-0-1	PCB - Aroclor 1254	0.200000E+05	UG/KG	AD559
413939	0705454	19850915	AM	AA	0	12	L2703	PCB _ Aroclor 1248	0.560000E+04	UG/KG	AD559
413939	0705454	9151985	AM	AA	0	12	L-27-0-1	PCB _ Aroclor 1248	0.560000E+04	UG/KG	AD559
413948	0705454	19850916	AM	AA	0	12	L2302	PCB - Aroclor 1254	0.490000E+05	UG/KG	AD562
413948	0705454	19850916	AM	AA	0	12	L2302	PCB _ Aroclor 1248	0.180000E+05	UG/KG	AD562
413948	0705454	9161985	AM	AA	0	12	L-23-0-1	PCB _ Aroclor 1248	0.180000E+05	UG/KG	AD562
413958	0705500	10061985	AM	AA	24	36	J-19-0-1	PCB - Aroclor 1254	0.130000E+04	UG/KG	AD568
413958	0705500	10061985	AM	AA	12	24	J-19-0-1	PCB - Aroclor 1254	0.370000E+03	UG/KG	AD569
413958	0705500	10061985	AM	AA	0	12	J-19-0-1	PCB - Aroclor 1254	0.390000E+05	UG/KG	AD570
413955	0705456	19851006	AM	AA	0	12	K2001	PCB - Aroclor 1254	0.300000E+05	UG/KG	AD586
413955	0705456	19851006	AM	AA	0	12	K2001	PCB _ Aroclor 1248	0.300000E+05	UG/KG	AD586
413958	0705455	19851006	AM	AA	0	12	K1901	PCB - Aroclor 1254	0.690000E+03	UG/KG	AD589
413941	0705449	19850915	AM	AA	0	12	M2601	PCB - Aroclor 1254	0.240000E+03	UG/KG	AD596
413943	0705452	19850915	AM	AA	0	12	L2511	PCB - Aroclor 1254	0.150000E+04	UG/KG	AD598
413956	0705453	19850916	AM	AA	0	12	L2001	PCB - Aroclor 1254	0.410000E+05	UG/KG	AD599
413956	0705453	19850916	AM	AA	0	12	L2001	PCB _ Aroclor 1248	0.840000E+04	UG/KG	AD599
413951	0705450	9161985	AM	AA	0	12	M-22-01	Lead	0.167000E+03	MG/KG	MAB750
413951	0705450	9161985	AM	AA	0	12	M-22-01	Copper	0.155000E+03	MG/KG	MAB750
413939	0705454	9151986	AM	AA	24	36	L-27	Lead	0.240000E+02	MG/KG	MAB751
413939	0705454	9151986	AM	AA	24	36	L-27	Copper	0.350000E+02	MG/KG	MAB751
413939	0705454	9151986	AM	AA	12	24	L-27	Lead	0.340000E+02	MG/KG	MAB752
413939	0705454	9151986	AM	AA	12	24	L-27	Copper	0.210000E+02	MG/KG	MAB752
413939	0705454	9151986	AM	AA	0	12	L-27	Lead	0.128000E+03	MG/KG	MAB753
413939	0705454	9151986	AM	AA	0	12	L-27	Copper	0.505000E+03	MG/KG	MAB753
413948	0705454	9161985	AM	AA	24	36	L-23	Lead	0.480000E+01	MG/KG	MAB754

413948	0705454	9161985	AM	AA	12	24	L-22	Lead	[illegible]	MG/KG	MAB755
413948	0705454	9161985	AM	AA	12	24	L-22	Copper	[illegible]	MG/KG	MAB755
413948	0705454	9161985	AM	AA	0	12	L-22	Lead	0.177000E+03	MG/KG	MAB756
413948	0705454	9161985	AM	AA	0	12	L-22	Copper	0.483000E+02	MG/KG	MAB756
413958	0705458	9141985	AM	AA	24	36	J-19	Lead	0.6[illegible]0000E+01	MG/KG	MAB762
413958	0705458	9141985	AM	AA	24	36	J-19	Copper	0.120000E+02	MG/KG	MAB762
413958	0705458	9141985	AM	AA	12	24	J-19	Lead	0.160000E+02	MG/KG	MAB763
413958	0705458	9141985	AM	AA	12	24	J-19	Copper	0.330000E+02	MG/KG	MAB763
413958	0705458	9141985	AM	AA	0	12	J-19	Lead	0.600000E+02	MG/KG	MAB764
413958	0705458	9141985	AM	AA	0	12	J-19	Copper	0.108000E+03	MG/KG	MAB764
413955	0705457	10061985	AM	AA	0	12	K-20-0-1	Lead	0.950000E+02	MG/KG	MAB780
413955	0705457	10061985	AM	AA	0	12	K-20-0-1	Copper	0.185000E+03	MG/KG	MAB780
413958	0705452	10061985	AM	AA	12	24	L-19-0-1	Lead	0.580000E+01	MG/KG	MAB781
413958	0705452	10061985	AM	AA	12	24	L-19-0-1	Copper	0.340000E+01	MG/KG	MAB781
413958	0705452	10061985	AM	AA	0	12	L-19-0-1	Lead	0.330000E+02	MG/KG	MAB782
413958	0705452	10061985	AM	AA	0	12	L-19-0-1	Copper	0.920000E+01	MG/KG	MAB782
413958	0705455	10061985	AM	AA	0	12	K-19-0-1	Lead	0.750000E+02	MG/KG	MAB783
413958	0705455	10061985	AM	AA	0	12	K-19-0-1	Copper	0.840000E+02	MG/KG	MAB783
413941	0705449	19850915	AM	AA	0	12	M2601	Lead	0.700000E+01	MG/KG	MAB790
413941	0705449	19850915	AM	AA	0	12	M2601	Cadmium	0.300000E+01	MG/KG	MAB790
413941	0705449	19850915	AM	AA	0	12	M2601	Copper	0.390000E+02	MG/KG	MAB790
413951	0705450	19850916	AM	AA	12	24	M2202	Lead	0.430000E+02	MG/KG	MAB791
413951	0705450	19850916	AM	AA	12	24	M2202	Cadmium	0.500000E+01	MG/KG	MAB791
413951	0705450	19850916	AM	AA	12	24	M2202	Copper	0.220000E+02	MG/KG	MAB791
413943	0705452	19850915	AM	AA	0	12	L2511	Lead	0.316000E+03	MG/KG	MAB792
413943	0705452	19850915	AM	AA	0	12	L2511	Cadmium	0.600000E+01	MG/KG	MAB792
413943	0705452	19850915	AM	AA	0	12	L2511	Copper	0.358000E+03	MG/KG	MAB792
413956	0705453	19850916	AM	AA	0	12	L2001	Lead	0.154000E+03	MG/KG	MAB793
413956	0705453	19850916	AM	AA	0	12	L2001	Cadmium	0.800000E+01	MG/KG	MAB793
413956	0705453	19850916	AM	AA	0	12	L2001	Copper	0.125000E+03	MG/KG	MAB793
414001	0705508	9141985	AM	AA	0	12	G-18	PCB - Aroclor 1248/1260	0.312000E+03	PPM DW	0030A
414001	0705508	9141985	AM	AA	12	24	G-18	PCB - Aroclor 1248/1260	0.144000E+04	PPM DW	0030B
414001	0705508	9141985	AM	AA	12	24	G-18	Lead	0.198000E+04	PPM DW	0030B
414001	0705508	9141985	AM	AA	12	24	G-18	Cadmium	0.360000E+02	PPM DW	0030B
414001	0705508	9141985	AM	AA	12	24	G-18	Copper	0.175000E+04	PPM DW	0030B
414001	0705508	9141985	AM	AA	24	36	G-18	PCB - Aroclor 1248/1260	0.375000E+03	PPM DW	0030C
414001	0705508	9141985	AM	AA	24	36	G-18	Lead	0.960000E+03	PPM DW	0030C
414001	0705508	9141985	AM	AA	24	36	G-18	Cadmium	0.200000E+01	PPM DW	0030C
414001	0705508	9141985	AM	AA	24	36	G-18	Copper	0.170000E+04	PPM DW	0030C
414014	0705506	9131985	AM	AA	0	12	H-12	PCB - Aroclor 1248/1260	0.837000E+04	PPM DW	0042A
414014	0705506	9131985	AM	AA	12	24	H-12	PCB - Aroclor 1248/1260	0.374000E+04	PPM DW	0042B
414014	0705506	9131985	AM	AA	0	12	I-12	PCB - Aroclor 1248/1260	0.137000E+04	PPM DW	0047A
414014	0705506	9131985	AM	AA	0	12	I-12	Lead	0.137000E+04	PPM DW	0047A
414014	0705506	9131985	AM	AA	0	12	I-12	Cadmium	0.137000E+04	PPM DW	0047A
414014	0705506	9131985	AM	AA	0	12	I-12	Copper	0.137000E+04	PPM DW	0047A
414014	0705506	9131985	AM	AA	12	24	I-12	PCB - Aroclor 1248/1260	0.730000E+02	PPM DW	0047B
414014	0705506	9131985	AM	AA	12	24	I-12	Lead	0.730000E+02	PPM DW	0047B
414014	0705506	9131985	AM	AA	12	24	I-12	Cadmium	0.730000E+02	PPM DW	0047B
414014	0705506	9131985	AM	AA	12	24	I-12	Copper	0.730000E+02	PPM DW	0047B
414028	0705459	9151985	AM	AA	0	1	J-7	PCB - Aroclor 1248/1260	0.218000E+05	PPM DW	0052A
414028	0705459	9151985	AM	AA	6	7	J-7	PCB - Aroclor 1248/1260	0.761000E+05	PPM DW	0052C
414028	0705459	9151985	AM	AA	12	13	J-7	PCB - Aroclor 1248/1260	0.540000E+05	PPM DW	0052D
414028	0705459	9151985	AM	AA	30	40	J-7	PCB - Aroclor 1248/1260	0.923000E+02	PPM DW	0052G
414020	0705457	9161985	AM	AA	0	12	J-10	PCB - Aroclor 1248/1260	0.856000E+04	PPM DW	0055A
414020	0705457	9161985	AM	AA	12	24	J-10	PCB - Aroclor 1248/1260	0.740000E+00	PPM DW	0055B
414015	0705459	9131985	AM	AA	0	5	J-12	PCB - Aroclor 1248/1260	0.173000E+03	PPM DW	0058A
414003	0705506	8291985	AM	AA	0	6	H-17	PCB - Aroclor 1248/1260	0.499000E+03	PPM DW	9877A
414003	0705506	8291985	AM	AA	6	18	H-17	PCB - Aroclor 1248/1260	0.405000E+01	PPM DW	9877B
414003	0705506	8291985	AM	AA	6	18	H-17	Lead	0.170000E+02	PPM DW	9877B
414003	0705506	8291985	AM	AA	6	18	H-17	Cadmium	0.000000E+00	PPM DW	9877B
414003	0705506	8291985	AM	AA	6	18	H-17	Copper	0.330000E+02	PPM DW	9877B
414003	0705506	8291985	AM	AA	18	36	H-17	PCB - Aroclor 1248/1260	0.115000E+01	PPM DW	9877C
414003	0705506	8291985	AM	AA	18	36	H-17	Lead	0.370000E+02	PPM DW	9877C
414003	0705506	8291985	AM	AA	18	36	H-17	Cadmium	0.300000E+01	PPM DW	9877C
414003	0705506	8291985	AM	AA	18	36	H-17	Copper	0.310000E+02	PPM DW	9877C

414007	0705502	9041985	AM	AA	0	6	I-15	Lead	[illegible]	PPM	DW	9902A
414007	0705502	9041985	AM	AA	0	6	I-15	Cadmium	[illegible]	PPM	DW	9902A
414007	0705502	9041985	AM	AA	0	6	I-15	Copper	0.129000E+04	PPM	DW	9902A
414007	0705502	9041985	AM	AA	6	24	I-15	PCB - Aroclor 1248/1260	0.161000E+02	PPM	DW	9902B
414007	0705502	9041985	AM	AA	6	24	I-15	Lead	0.600000E+02	PPM	DW	9902B
414007	0705502	9041985	AM	AA	6	24	I-15	Cadmium	0.400000E+01	PPM	DW	9902B
414007	0705502	9041985	AM	AA	6	24	I-15	Copper	0.129000E+03	PPM	DW	9902B
414007	0705502	9041985	AM	AA	24	36	I-15	PCB - Aroclor 1248/1260	0.630000E+00	PPM	DW	9902C
414007	0705502	9041985	AM	AA	24	36	I-15	Lead	0.000000E+00	PPM	DW	9902C
414007	0705502	9041985	AM	AA	24	36	I-15	Cadmium	0.000000E+00	PPM	DW	9902C
414007	0705502	9041985	AM	AA	24	36	I-15	Copper	0.900000E+01	PPM	DW	9902C
414013	0705509	9131985	AM	AA	0	10	6-13-1	PCB - Aroclor 1248/1260	0.798000E+02	PPM	DW	9914A
414013	0705509	9131985	AM	AA	0	10	6-13-1	Lead	0.000000E+00	PPM	DW	9914A
414013	0705509	9131985	AM	AA	0	10	6-13-1	Cadmium	0.000000E+00	PPM	DW	9914A
414013	0705509	9131985	AM	AA	0	10	6-13-1	Copper	0.240000E+02	PPM	DW	9914A
414013	0705509	9131985	AM	AA	24	36	6-13-1	PCB - Aroclor 1248/1260	0.800000E-01	PPM	DW	9914C
414013	0705509	9131985	AM	AA	24	36	6-13-1	Lead	0.000000E+00	PPM	DW	9914C
414013	0705509	9131985	AM	AA	24	36	6-13-1	Cadmium	0.000000E+00	PPM	DW	9914C
414013	0705509	9131985	AM	AA	24	36	6-13-1	Copper	0.100000E+02	PPM	DW	9914C
414002	0705508	9141985	AM	AA	0	24	6-17-2	PCB - Aroclor 1248/1260	0.114700E+04	PPM	DW	9918A
414002	0705508	9141985	AM	AA	0	24	6-17-2	Lead	0.142000E+04	PPM	DW	9918A
414002	0705508	9141985	AM	AA	0	24	6-17-2	Cadmium	0.540000E+02	PPM	DW	9918A
414002	0705508	9141985	AM	AA	0	24	6-17-2	Copper	0.190000E+04	PPM	DW	9918A
414002	0705508	9141985	AM	AA	24	38	6-17-2	PCB - Aroclor 1248/1260	0.557000E+03	PPM	DW	9918B
414002	0705508	9141985	AM	AA	24	38	6-17-2	Lead	0.150000E+04	PPM	DW	9918B
414002	0705508	9141985	AM	AA	24	38	6-17-2	Cadmium	0.800000E+01	PPM	DW	9918B
414002	0705508	9141985	AM	AA	24	38	6-17-2	Copper	0.167000E+04	PPM	DW	9918B
414002	0705508	9141985	AM	AA	45	49	6-17-2	PCB - Aroclor 1248/1260	0.321000E+01	PPM	DW	9919D
414002	0705508	9141985	AM	AA	45	49	6-17-2	Lead	0.130000E+04	PPM	DW	9919D
414002	0705508	9141985	AM	AA	45	49	6-17-2	Cadmium	0.100000E+02	PPM	DW	9919D
414002	0705508	9141985	AM	AA	45	49	6-17-2	Copper	0.205000E+04	PPM	DW	9919D
414002	0705508	9141985	AM	AA	49	65	6-17-2	PCB - Aroclor 1248/1260	0.579000E+01	PPM	DW	9919E
414002	0705508	9141985	AM	AA	49	65	6-17-2	Lead	0.474000E+03	PPM	DW	9919E
414002	0705508	9141985	AM	AA	49	65	6-17-2	Cadmium	0.400000E+01	PPM	DW	9919E
414002	0705508	9141985	AM	AA	49	65	6-17-2	Copper	0.628000E+03	PPM	DW	9919E
414037	0705501	9151985	AM	AA	0	18	I-3-1	PCB - Aroclor 1248/1260	0.938000E+03	PPM	DW	9925A
414037	0705501	9151985	AM	AA	0	18	I-3-1	Lead	0.892000E+03	PPM	DW	9925A
414037	0705501	9151985	AM	AA	0	18	I-3-1	Cadmium	0.200000E+02	PPM	DW	9925A
414037	0705501	9151985	AM	AA	0	18	I-3-1	Copper	0.118000E+04	PPM	DW	9925A
414037	0705501	9151985	AM	AA	18	28	I-3-1	PCB - Aroclor 1248/1260	0.220000E+00	PPM	DW	9925B
414037	0705501	9151985	AM	AA	18	28	I-3-1	Lead	0.540000E+02	PPM	DW	9925B
414037	0705501	9151985	AM	AA	18	28	I-3-1	Cadmium	0.000000E+00	PPM	DW	9925B
414037	0705501	9151985	AM	AA	18	28	I-3-1	Copper	0.250000E+02	PPM	DW	9925B
414022	0705503	9171985	AM	AA	0	22	I-9-1	PCB - Aroclor 1248/1260	0.146000E+03	PPM	DW	9927A
414022	0705503	9171985	AM	AA	0	22	I-9-1	Lead	0.484000E+03	PPM	DW	9927A
414022	0705503	9171985	AM	AA	0	22	I-9-1	Cadmium	0.600000E+01	PPM	DW	9927A
414022	0705503	9171985	AM	AA	0	22	I-9-1	Copper	0.719000E+03	PPM	DW	9927A
414022	0705503	9171985	AM	AA	22	29	I-9-1	PCB - Aroclor 1248/1260	0.100000E+00	PPM	DW	9928B
414022	0705503	9171985	AM	AA	22	29	I-9-1	Lead	0.000000E+00	PPM	DW	9928B
414022	0705503	9171985	AM	AA	22	29	I-9-1	Cadmium	0.000000E+00	PPM	DW	9928B
414022	0705503	9171985	AM	AA	22	29	I-9-1	Copper	0.800000E+01	PPM	DW	9928B
414017	0705503	9171985	AM	AA	0	13	I-11-1	PCB - Aroclor 1248/1260	0.360000E+05	PPM	DW	9930A
414017	0705503	9171985	AM	AA	0	13	I-11-1	Lead	0.971000E+03	PPM	DW	9930A
414017	0705503	9171985	AM	AA	0	13	I-11-1	Cadmium	0.560000E+02	PPM	DW	9930A
414017	0705503	9171985	AM	AA	0	13	I-11-1	Copper	0.151000E+04	PPM	DW	9930A
414017	0705503	9171985	AM	AA	13	24	I-11-1	PCB - Aroclor 1248/1260	0.664000E+02	PPM	DW	9930B
414017	0705503	9171985	AM	AA	13	24	I-11-1	Lead	0.430000E+02	PPM	DW	9930B
414017	0705503	9171985	AM	AA	13	24	I-11-1	Cadmium	0.000000E+00	PPM	DW	9930B
414017	0705503	9171985	AM	AA	13	24	I-11-1	Copper	0.470000E+02	PPM	DW	9930B
414017	0705503	9171985	AM	AA	24	36	I-11-1	PCB - Aroclor 1248/1260	0.106000E+01	PPM	DW	9930C
414017	0705503	9171985	AM	AA	24	36	I-11-1	Lead	0.000000E+00	PPM	DW	9930C
414017	0705503	9171985	AM	AA	24	36	I-11-1	Cadmium	0.000000E+00	PPM	DW	9930C
414017	0705503	9171985	AM	AA	24	36	I-11-1	Copper	0.900000E+01	PPM	DW	9930C
414017	0705503	9171985	AM	AA	0	12	I-11-2	PCB - Aroclor 1248/1260	0.225000E+05	PPM	DW	9932A
414017	0705503	9171985	AM	AA	0	12	I-11-2	Lead	0.225000E+05	PPM	DW	9932A
414017	0705503	9171985	AM	AA	0	12	I-11-2	Cadmium	[illegible]			

UNITED STATES COAST GUARD SAMPLING PROGRAM: 1982
UPPER ACUSHNET RIVER ESTUARY
HOT SPOT AREA
SUMMARY OF AROCHLOR DATA

SAMPLE NO.	DEPTH (INCHES)	PCBs (PPM)
1	0-12	1,670
2	0-6.5	310
3	0-6.5	1,860
4	0-6.5	1,230
5	0-13	329
6	0-6.5	610
7	0-6.5	3,336
8	0-6.5	7,650
9	0-6.5	27,535
10	0-9.5	9,923
11	0-13	516
12	0-7.5	336
13	0-12	821
14	0-12.5	.445
15	0-6.5	775
16	0-12	71
17	0-11.5	2,386
18	0-11	787
19	0-6.5	1,100
20	0-11	543
21	0-9	770
22	0-12	1,139
23	11.5	440
24	0-6.5	775
25	0-6.5	3,215
26	0-12	3,160
27	0-6.5	34,240
29	0-6.5	1,280
30	0-6.5	1,205
31	0-10	1,587
32	0-10	3,230
33	0-12	1,733

414017	0705459	19851029	AM	AA	12	24	J11	PCB - Aroclor 1242	[illegible] UG/KG	AD938
414005	0705506	19851030	AM	AA	12	24		PCB - Aroclor 1254	0.480000E+03 UG/KG	AD939
414005	0705506	19851030	AM	AA	12	24		PCB - Aroclor 1242	0.100000E+04 UG/KG	AD939
414005	0705506	19851030	AM	AA	12	24		PCB - Aroclor 1254	0.740000E+03 UG/KG	AD940
414005	0705506	19851030	AM	AA	12	24		PCB - Aroclor 1242	0.300000E+04 UG/KG	AD940
414005	0705506	19851030	AM	AA	6	12		PCB - Aroclor 1254	0.750000E+04 UG/KG	AD941
414005	0705506	19851030	AM	AA	6	12		PCB - Aroclor 1242	0.150000E+05 UG/KG	AD941
414005	0705506	19851030	AM	AA	0	6		PCB - Aroclor 1254	0.440000E+06 UG/KG	AD942
414005	0705506	19851030	AM	AA	0	6		PCB - Aroclor 1242	0.120000E+07 UG/KG	AD942
414012	0705502	19851030	AM	AA	12	24		PCB - Aroclor 1254	0.870000E+04 UG/KG	AD943
414012	0705502	19851030	AM	AA	12	24		PCB - Aroclor 1242	0.130000E+05 UG/KG	AD943
414005	0705506	19850829	AM	AA	12	24	H16	Copper	0.900000E+01 MG/KG	MAB855
414012	0705502	19850904	AM	AA	12	24	I13	Copper	0.150000E+02 MG/KG	MAB858
414017	0705459	19850916	AM	AA	24	NA	J11	Copper	0.700000E+01 MG/KG	MAB860
414020	0705503	19850917	AM	AA	24	NA	I10	Copper	0.800000E+01 MG/KG	MAB865
414027	0705456	19850916	AM	AA	24	NA	K7	Copper	0.700000E+01 MG/KG	MAB870

414032	0705449	10051985	AM	AA	0	12	M-5-0-1	Cadmium	0.000000E+00	MG/KG	MAB776
414032	0705449	10051985	AM	AA	0	12	M-5-0-1	Copper	0.306000E+02	MG/KG	MAB776
414025	0705444	10051985	AM	AA	24	36	N-8-0-1	Lead	0.167000E+03	MG/KG	MAB777
414025	0705444	10051985	AM	AA	24	36	N-8-0-1	Copper	0.700000E+02	MG/KG	MAB777
414025	0705444	10051985	AM	AA	12	24	N-8-0-1	Lead	0.440000E+03	MG/KG	MAB776
414025	0705444	10051985	AM	AA	12	24	N-8-0-1	Copper	0.343000E+03	MG/KG	MAB778
414025	0705444	10051985	AM	AA	0	12	N-8-0-1	Lead	0.277000E+03	MG/KG	MAB779
414025	0705444	10051985	AM	AA	0	12	N-8-0-1	Copper	0.333000E+03	MG/KG	MAB779
414003	0705456	10061985	AM	AA	0	12	K-17-0-1	Lead	0.140000E+02	MG/KG	MAB784
414003	0705456	10061985	AM	AA	0	12	K-17-0-1	Copper	0.140000E+02	MG/KG	MAB784
414007	0705456	10061985	AM	AA	0	12	K-15-0-1	Lead	0.460000E+01	MG/KG	MAB785
414007	0705456	10061985	AM	AA	0	12	K-15-0-1	Copper	0.810000E+01	MG/KG	MAB785
414010	0705455	10061985	AM	AA	0	12	K-14-0-1	Lead	0.273000E+03	MG/KG	MAB786
414010	0705455	10061985	AM	AA	0	12	K-14-0-1	Copper	0.338000E+03	MG/KG	MAB786
414028	0705446	10051985	AM	AA	0	12	N-7-1-1	Lead	0.203000E+03	MG/KG	MAB787
414028	0705446	10051985	AM	AA	0	12	N-7-1-1	Copper	0.200000E+02	MG/KG	MAB787
414030	0705447	10051985	AM	AA	0	12	N-6-0-1	Lead	0.153000E+03	MG/KG	MAB788
414030	0705447	10051985	AM	AA	0	12	N-6-0-1	Copper	0.119000E+03	MG/KG	MAB788
414033	0705452	10051985	AM	AA	0	12	L-5-0-1	Lead	0.375000E+03	MG/KG	MAB789
414033	0705452	10051985	AM	AA	0	12	L-5-0-1	Copper	0.167000E+03	MG/KG	MAB789
414004	0705456	19850916	AM	AA	0	12	K1601	Lead	0.150000E+02	MG/KG	MAB794
414004	0705456	19850916	AM	AA	0	12	K1601	Cadmium	0.200000E+01	MG/KG	MAB794
414004	0705456	19850916	AM	AA	0	12	K1601	Copper	0.230000E+02	MG/KG	MAB794

GROUP 3 USACE FIT SAMPLING PROGRAM

7500 ts ncr_ecd_3e.dat

LALALA T_T_T_ D M S	LONLOLO _D N_N_ M S	DATE_ SAMPLED	MATERIAL	FRACTION	DEPTH_T	DEPTH_B	ORIG_ STATION	PARAMETER	CONC	UNITS	LAB_ID
		19851030	AM	AG	NA	NA		PCB - Aroclor 1254	0.210000E+03	UG/KG	AD920
413926	0705506	19851030	AM	AA	12	24		PCB - Aroclor 1254	0.540000E+04	UG/KG	AD921
413926	0705506	19851030	AM	AA	12	24		PCB - Aroclor 1242	0.230000E+05	UG/KG	AD921
413926	0705506	19851030	AM	AA	6	12		PCB - Aroclor 1254	0.370000E+04	UG/KG	AD922
413926	0705506	19851030	AM	AA	6	12		PCB - Aroclor 1242	0.190000E+05	UG/KG	AD922
413926	0705506	19851030	AM	AA	0	6		PCB - Aroclor 1254	0.480000E+04	UG/KG	AD924
413926	0705506	19851030	AM	AA	0	6		PCB - Aroclor 1242	0.860000E+04	UG/KG	AD924
413933	0705500	19851030	AM	AA	12	24		PCB - Aroclor 1254	0.420000E+03	UG/KG	AD925
413933	0705500	19851030	AM	AA	6	12		PCB - Aroclor 1254	0.210000E+04	UG/KG	AD926
413933	0705500	19851030	AM	AA	6	12		PCB _ Aroclor 1248	0.230000E+04	UG/KG	AD926
413933	0705500	19851030	AM	AA	0	6		PCB - Aroclor 1254	0.470000E+04	UG/KG	AD927
413933	0705500	19851030	AM	AA	0	6		PCB _ Aroclor 1248	0.690000E+04	UG/KG	AD927
413941	0705509	19851030	AM	AA	12	24		PCB - Aroclor 1254	0.120000E+04	UG/KG	AD929
413941	0705509	19851030	AM	AA	12	24		PCB _ Aroclor 1248	0.120000E+04	UG/KG	AD929
413941	0705509	19851030	AM	AA	6	12		PCB - Aroclor 1254	0.570000E+04	UG/KG	AD930
413941	0705509	19851030	AM	AA	6	12		PCB - Aroclor 1242	0.250000E+03	UG/KG	AD930
413941	0705509	19851030	AM	AA	0	6		PCB - Aroclor 1254	0.130000E+05	UG/KG	AD931
413941	0705509	19851030	AM	AA	0	6		PCB - Aroclor 1242	0.200000E+06	UG/KG	AD931
413950	0705506	19851030	AM	AA	12	24		PCB - Aroclor 1254	0.210000E+05	UG/KG	AD932
413950	0705506	19851030	AM	AA	12	24		PCB _ Aroclor 1248	0.120000E+05	UG/KG	AD932
413950	0705506	19851030	AM	AA	6	12		PCB - Aroclor 1254	0.380000E+06	UG/KG	AD933
413950	0705506	19851030	AM	AA	6	12		PCB _ Aroclor 1248	0.880000E+06	UG/KG	AD933
413950	0705506	19851030	AM	AA	0	6		PCB - Aroclor 1254	0.780000E+05	UG/KG	AD934
413950	0705506	19851030	AM	AA	0	6		PCB - Aroclor 1242	0.120000E+06	UG/KG	AD934
413956	0705503	19851030	AM	AA	24	NA		PCB - Aroclor 1254	0.320000E+03	UG/KG	AD935
413956	0705503	19851030	AM	AA	24	NA		PCB - Aroclor 1242	0.100000E+04	UG/KG	AD935
413956	0705503	19851030	AM	AA	12	24		PCB - Aroclor 1254	0.170000E+04	UG/KG	AD936
413956	0705503	19851030	AM	AA	12	24		PCB - Aroclor 1242	0.120000E+04	UG/KG	AD936
413956	0705503	19851030	AM	AA	6	12		PCB - Aroclor 1254	0.520000E+06	UG/KG	AD937
413956	0705503	19851030	AM	AA	6	12		PCB - Aroclor 1242	0.110000E+07	UG/KG	AD937
413956	0705503	19851030	AM	AA	0	6		PCB - Aroclor 1254	0.240000E+06	UG/KG	AD938
413956	0705503	19851030	AM	AA	0	6		PCB - Aroclor 1242	0.680000E+06	UG/KG	AD938
413933	0705500	19850828	AM	AA	12	24	J29	Copper	0.140000E+02	MG/KG	MAB840
413941	0705509	19850910	AM	AA	24	NA	G26	Copper	0.600000E+01	MG/KG	MAB843
413941	0705509	19850910	AM	AA	12	24	G26	Copper	0.300000E+01	MG/KG	MAB844
414012	0705502	19851029	AM	AA	0	6	I13	PCB - Aroclor 1242	0.225000E+08	UG/KG	AD825
414027	0705456	19851030	AM	AA	0	6	K7	PCB - Aroclor 1242	0.370000E+06	UG/KG	AD826
414027	0705456	19851030	AM	AA	6	12	K7	PCB - Aroclor 1242	0.121000E+06	UG/KG	AD827
414027	0705456	19851030	AM	AA	12	24	K7	PCB - Aroclor 1242	0.147800E+04	UG/KG	AD828
414027	0705456	19851030	AM	AA	24	NA	K7	PCB - Aroclor 1242	0.110000E+04	UG/KG	AD829
414021	0705458	19851029	AM	AA	8	20	K9	PCB - Aroclor 1242	0.209000E+07	UG/KG	AD830
414021	0705458	19851029	AM	AA	20	30	K9	PCB - Aroclor 1242	0.743400E+05	UG/KG	AD831
414020	0705502	19851029	AM	AA	6	12	I10	PCB - Aroclor 1242	0.266000E+07	UG/KG	AD832
414020	0705503	19851029	AM	AA	12	24		PCB - Aroclor 1254	0.640000E+04	UG/KG	AD833
414020	0705502	19851029	AM	AA	12	24		PCB - Aroclor 1242	0.230000E+05	UG/KG	AD833
414020	0705502	19851029	AM	AA	24	NA	I10	PCB - Aroclor 1242	0.408000E+06	UG/KG	AD834
414017	0705459	19851029	AM	AA	0	6	J11	PCB - Aroclor 1242	0.114000E+07	UG/KG	AD835
414021	0705458	19851029	AM	AA	NA	NA		PCB - Aroclor 1242	0.351000E+04	UG/KG	AD836

414013	0705457	10061985	AM	AA	24	36	K-13-0-1	PCB - Aroclor 1254	[illegible]	UG/KG	AD574
414013	0705457	10061985	AM	AA	24	36	K-13-0-1	PCB - Aroclor 1242	[illegible]	UG/KG	AD574
414013	0705457	10061985	AM	AA	12	24	K-13-0-1	PCB - Aroclor 1254	0.250000E+04	UG/KG	AD575
414013	0705457	10061985	AM	AA	12	24	K-13-0-1	PCB - Aroclor 1242	0.120000E+05	UG/KG	AD575
414013	0705457	10061985	AM	AA	0	12	K-13-0-1	PCB - Aroclor 1254	0.120000E+04	MG/KG	AD576
414013	0705457	10061985	AM	AA	0	12	K-13-0-1	PCB - Aroclor 1242	0.700000E+06	UG/KG	AD576
414015	0705456	10061985	AM	AA	24	36	K-12-0-1	PCB - Aroclor 1254	0.840000E+03	UG/KG	AD577
414015	0705456	10061985	AM	AA	12	24	K-12-0-1	PCB - Aroclor 1254	0.720000E+04	UG/KG	AD578
414015	0705456	10061985	AM	AA	0	12	K-12-0-1	PCB - Aroclor 1254	0.660000E+05	UG/KG	AD579
414032	0705449	10051985	AM	AA	24	36	M-5-0-1	PCB - Aroclor 1254	0.510000E+04	UG/KG	AD580
414032	0705449	10051985	AM	AA	24	36	M-5-0-1	PCB - Aroclor 1242	0.610000E+04	UG/KG	AD580
414032	0705449	10051985	AM	AA	12	24	M-5-0-1	PCB - Aroclor 1254	0.310000E+04	UG/KG	AD581
414032	0705449	10051985	AM	AA	0	12	M-5-0-1	PCB - Aroclor 1254	0.300000E+06	UG/KG	AD582
414032	0705449	10051985	AM	AA	0	12	M-5-0-1	PCB - Aroclor 1242	0.140000E+06	UG/KG	AD582
414025	0705445	10051985	AM	AA	24	26	N-8-0-1	PCB - Aroclor 1254	0.170000E+05	UG/KG	AD583
414025	0705445	10051985	AM	AA	24	26	N-8-0-1	PCB - Aroclor 1242	0.250000E+05	UG/KG	AD583
414025	0705445	10051985	AM	AA	12	24	N-8-0-1	PCB - Aroclor 1254	0.400000E+05	UG/KG	AD584
414025	0705444	19851005	AM	AA	12	24	53256	PCB - Aroclor 1242	0.640000E+05	UG/KG	AD584
414025	0705445	10051985	AM	AA	0	12	N-8-0-1	PCB - Aroclor 1254	0.270000E+06	UG/KG	AD585
414025	0705445	10051985	AM	AA	0	12	N-8-0-1	PCB - Aroclor 1242	0.230000E+06	UG/KG	AD585
414003	0705456	19851006	AM	AA	0	12	K1701	PCB - Aroclor 1254	0.150000E+03	UG/KG	AD590
414010	0705455	19851006	AM	AA	0	12	K1401	PCB - Aroclor 1254	0.130000E+06	UG/KG	AD592
414010	0705455	19851006	AM	AA	0	12	K1401	PCB _ Aroclor 1248	0.310000E+05	UG/KG	AD592
414028	0705446	19851005	AM	AA	0	12	N711	PCB - Aroclor 1254	0.210000E+04	UG/KG	AD593
414028	0705446	19851005	AM	AA	0	12	N711	PCB _ Aroclor 1248	0.470000E+03	UG/KG	AD593
414030	0705447	19851005	AM	AA	0	12	N601	PCB - Aroclor 1254	0.600000E+04	UG/KG	AD594
414030	0705447	19851005	AM	AA	0	12	N601	PCB _ Aroclor 1248	0.810000E+03	UG/KG	AD594
414033	0705452	19851005	AM	AA	0	12	L501	PCB - Aroclor 1254	0.170000E+06	UG/KG	AD595
414033	0705452	19851005	AM	AA	0	12	L501	PCB - Aroclor 1242	0.390000E+06	UG/KG	AD595
414004	0705456	19850916	AM	AA	0	12	K1601	PCB - Aroclor 1254	0.130000E+04	UG/KG	AD600
414004	0705456	19850916	AM	AA	0	12	K1601	PCB _ Aroclor 1248	0.230000E+03	UG/KG	AD600
414001	0705457	9161985	AM	AA	24	36	K-18	Lead	0.630000E+01	MG/KG	MAB757
414001	0705457	9161985	AM	AA	24	36	K-18	Copper	0.130000E+02	MG/KG	MAB757
414001	0705457	9161985	AM	AA	12	24	K-18	Lead	0.270000E+02	MG/KG	MAB758
414001	0705457	9161985	AM	AA	12	24	K-18	Copper	0.430000E+02	MG/KG	MAB758
414001	0705457	9161985	AM	AA	0	12	K-18	Lead	0.165000E+03	MG/KG	MAB759
414001	0705457	9161985	AM	AA	0	12	K-18	Copper	0.172000E+03	MG/KG	MAB759
414009	0705452	9131985	AM	AA	24	30	L-14	Lead	0.130000E+02	MG/KG	MAB765
414009	0705452	9131985	AM	AA	24	30	L-14	Copper	0.120000E+02	MG/KG	MAB765
414009	0705452	9131985	AM	AA	12	24	L-14	Lead	0.100000E+02	MG/KG	MAB766
414009	0705452	9131985	AM	AA	12	24	L-14	Copper	0.950000E+01	MG/KG	MAB766
414009	0705452	9131985	AM	AA	0	12	L-14	Lead	0.240000E+02	MG/KG	MAB767
414009	0705452	9131985	AM	AA	0	12	L-14	Copper	0.110000E+02	MG/KG	MAB767
414012	0705456	9061985	AM	AA	24	36	K-13	Lead	0.145000E+03	MG/KG	MAB768
414012	0705456	9061985	AM	AA	24	36	K-13	Copper	0.790000E+02	MG/KG	MAB768
414012	0705456	9061985	AM	AA	12	24	K-13	Lead	0.691000E+04	MG/KG	MAB769
414012	0705456	9061985	AM	AA	12	24	K-13	Copper	0.223000E+05	MG/KG	MAB769
414012	0705456	10061985	AM	AA	0	12	K-13-0-1	Lead	0.435000E+03	MG/KG	MAB770
414012	0705456	10061985	AM	AA	0	12	K-13-0-1	Cadmium	0.820000E+01	MG/KG	MAB770
414012	0705456	10061985	AM	AA	0	12	K-13-0-1	Copper	0.557000E+03	MG/KG	MAB770
414015	0705456	10061985	AM	AA	24	36	K-12-0-1	Lead	0.140000E+02	MG/KG	MAB771
414015	0705456	10061985	AM	AA	24	36	K-12-0-1	Cadmium	0.000000E+00	MG/KG	MAB771
414015	0705456	10061985	AM	AA	24	36	K-12-0-1	Copper	0.280000E+02	MG/KG	MAB771
414015	0705456	10061985	AM	AA	12	24	K-12-0-1	Lead	0.120000E+02	MG/KG	MAB772
414015	0705456	10061985	AM	AA	12	24	K-12-0-1	Cadmium	0.000000E+00	MG/KG	MAB772
414015	0705456	10061985	AM	AA	12	24	K-12-0-1	Copper	0.250000E+02	MG/KG	MAB772
414015	0705456	10061985	AM	AA	0	12	K-12-0-1	Lead	0.162000E+03	MG/KG	MAB773
414015	0705456	10061985	AM	AA	0	12	K-12-0-1	Cadmium	0.000000E+00	MG/KG	MAB773
414015	0705456	10061985	AM	AA	0	12	K-12-0-1	Copper	0.287000E+03	MG/KG	MAB773
414032	0705449	10051985	AM	AA	24	36	M-5-0-1	Lead	0.170000E+02	MG/KG	MAB774
414032	0705449	10051985	AM	AA	24	36	M-5-0-1	Cadmium	0.000000E+00	MG/KG	MAB774
414032	0705449	10051985	AM	AA	24	36	M-5-0-1	Copper	0.250000E+02	MG/KG	MAB774
414032	0705449	10051985	AM	AA	12	24	M-5-0-1	Lead	0.550000E+02	MG/KG	MAB775
414032	0705449	10051985	AM	AA	12	24	M-5-0-1	Cadmium	0.000000E+00	MG/KG	MAB775
414032	0705449	10051985	AM	AA	12	24	M-5-0-1	Copper	[illegible]		

414017	0705503	9171985	AM AA	0	12	I-11-1	Copper	0.225000E+05	PPM DW	9932A
414017	0705503	9171985	AM AA	12	24	I-11-1	PCB - Aroclor 1248/1260	0.112000E+05	PPM DW	9932B
414017	0705503	9171985	AM AA	12	24	I-11-1	Lead	0.112000E+05	PPM DW	9932B
414017	0705503	9171985	AM AA	12	24	I-11-2	Cadmium	0.112000E+05	PPM DW	9932B
414017	0705503	9171985	AM AA	12	24	I-11-2	Copper	0.112000E+05	PPM DW	9932B
414032	0705459	9151985	AM AA	0	24	J-5-1	PCB - Aroclor 1248/1260	0.282000E+03	PPM DW	9934A
414032	0705459	9151985	AM AA	0	24	J-5-1	Lead	0.223000E+03	PPM DW	9934A
414032	0705459	9151985	AM AA	0	24	J-5-1	Cadmium	0.400000E+01	PPM DW	9934A
414032	0705459	9151985	AM AA	0	24	J-5-1	Copper	0.165000E+03	PPM DW	9934A
414032	0705459	9151985	AM AA	24	36	J-5-1	PCB - Aroclor 1248/1260	0.200000E+00	PPM DW	9934B
414032	0705459	9151985	AM AA	24	36	J-5-1	Lead	0.000000E+00	PPM DW	9934B
414032	0705459	9151985	AM AA	24	36	J-5-1	Cadmium	0.000000E+00	PPM DW	9934B
414032	0705459	9151985	AM AA	24	36	J-5-1	Copper	0.800000E+01	PPM DW	9934B
414025	0705500	9161985	AM AA	0	24	J-8-2	PCB - Aroclor 1248/1260	0.234000E+04	PPM DW	9938A
414025	0705500	9161985	AM AA	0	24	J-8-2	Lead	0.791000E+03	PPM DW	9938A
414025	0705500	9161985	AM AA	0	24	J-8-2	Cadmium	0.120000E+02	PPM DW	9938A
414025	0705500	9161985	AM AA	0	24	J-8-2	Copper	0.106000E+04	PPM DW	9938A
414025	0705500	9161985	AM AA	24	32	J-8-2	PCB - Aroclor 1248/1260	0.122000E+01	PPM DW	9938B
414025	0705500	9161985	AM AA	24	32	J-8-2	Lead	0.153000E+03	PPM DW	9938B
414025	0705500	9161985	AM AA	24	32	J-8-2	Cadmium	0.000000E+00	PPM DW	9938B
414025	0705500	9161985	AM AA	24	32	J-8-2	Copper	0.137000E+03	PPM DW	9938B
414012	0705459	9131985	AM AA	0	8	J-13-2	PCB - Aroclor 1248/1260	0.139000E+03	PPM DW	9941A
414012	0705459	9131985	AM AA	0	8	J-13-2	Lead	0.181000E+03	PPM DW	9941A
414012	0705459	9131985	AM AA	0	8	J-13-2	Cadmium	0.300000E+01	PPM DW	9941A
414012	0705459	9131985	AM AA	0	8	J-13-2	Copper	0.355000E+03	PPM DW	9941A
414012	0705459	9131985	AM AA	8	20	J-13-2	PCB - Aroclor 1248/1260	0.140000E+00	PPM DW	9941B
414012	0705459	9131985	AM AA	8	20	J-13-2	Lead	0.330000E+02	PPM DW	9941B
414012	0705459	9131985	AM AA	8	20	J-13-2	Cadmium	0.200000E+01	PPM DW	9941B
414012	0705459	9131985	AM AA	8	20	J-13-2	Copper	0.470000E+02	PPM DW	9941B
414009	0705459	9131985	AM AA	0	16	J-15-1	PCB - Aroclor 1248/1260	0.582000E+02	PPM DW	9942A
414009	0705459	9131985	AM AA	0	16	J-15-1	Lead	0.880000E+02	PPM DW	9942A
414009	0705459	9131985	AM AA	0	16	J-15-1	Cadmium	0.200000E+01	PPM DW	9942A
414009	0705459	9131985	AM AA	0	16	J-15-1	Copper	0.197000E+03	PPM DW	9942A
414032	0705456	9151985	AM AA	0	12	K-5-2	PCB - Aroclor 1248/1260	0.440000E+03	PPM DW	9949A
414032	0705456	9151985	AM AA	0	12	K-5-2	Lead	0.174000E+03	PPM DW	9949A
414032	0705456	9151985	AM AA	0	12	K-5-2	Cadmium	0.700000E+01	PPM DW	9949A
414032	0705456	9151985	AM AA	0	12	K-5-2	Copper	0.296000E+03	PPM DW	9949A
414032	0705456	9151985	AM AA	12	24	K-5-2	PCB - Aroclor 1248/1260	0.234000E+01	PPM DW	9949B
414032	0705456	9151985	AM AA	12	24	K-5-2	Lead	0.270000E+02	PPM DW	9949B
414032	0705456	9151985	AM AA	12	24	K-5-2	Cadmium	0.000000E+00	PPM DW	9949B
414032	0705456	9151985	AM AA	12	24	K-5-2	Copper	0.310000E+02	PPM DW	9949B
414032	0705456	9151985	AM AA	24	33	K-5-2	PCB - Aroclor 1248/1260	0.500000E-01	PPM DW	9949C
414032	0705456	9151985	AM AA	24	33	K-5-2	Lead	0.000000E+00	PPM DW	9949C
414032	0705456	9151985	AM AA	24	33	K-5-2	Cadmium	0.000000E+00	PPM DW	9949C
414032	0705456	9151985	AM AA	24	33	K-5-2	Copper	0.100000E+02	PPM DW	9949C
414021	0705703	9161985	AM AA	0	11	L-10-1	PCB - Aroclor 1248/1260	0.318000E+03	PPM DW	9956A
414021	0705703	9161985	AM AA	0	11	L-10-1	Lead	0.838000E+03	PPM DW	9956A
414021	0705703	9161985	AM AA	0	11	L-10-1	Cadmium	0.120000E+02	PPM DW	9956A
414021	0705703	9161985	AM AA	0	11	L-10-1	Copper	0.153000E+04	PPM DW	9956A
414021	0705703	9161985	AM AA	24	36	L-10-1	PCB - Aroclor 1248/1260	0.800000E-01	PPM DW	9956C
414021	0705703	9161985	AM AA	24	36	L-10-1	Lead	0.000000E+00	PPM DW	9956C
414021	0705703	9161985	AM AA	24	36	L-10-1	Cadmium	0.000000E+00	PPM DW	9956C
414021	0705703	9161985	AM AA	24	36	L-10-1	Copper	0.100000E+02	PPM DW	9956C
414030	0705449	9161985	AM AA	0	24	M-6-2	PCB - Aroclor 1248/1260	0.607000E+03	PPM DW	9965A
414030	0705449	9161985	AM AA	0	24	M-6-2	Lead	0.497000E+03	PPM DW	9965A
414030	0705449	9161985	AM AA	0	24	M-6-2	Cadmium	0.500000E+01	PPM DW	9965A
414030	0705449	9161985	AM AA	0	24	M-6-2	Copper	0.717000E+03	PPM DW	9965A
414030	0705449	9161985	AM AA	24	31	M-6-2	PCB - Aroclor 1248/1260	0.350000E+00	PPM DW	9965B
414030	0705449	9161985	AM AA	24	31	M-6-2	Lead	0.000000E+00	PPM DW	9965B
414030	0705449	9161985	AM AA	24	31	M-6-2	Cadmium	0.000000E+00	PPM DW	9965B
414030	0705449	9161985	AM AA	24	31	M-6-2	Copper	0.000000E+00	PPM DW	9965B
414001	0705457	9161985	AM AA	24	36	K-18	PCB - Aroclor 1254	0.740000E+02	UG/KG	AD563
414001	0705457	19850916	AM AA	0	12	K1811	PCB - Aroclor 1254	0.420000E+04	UG/KG	AD565
414001	0705457	9161985	AM AA	0	12	K-18-1-1	PCB _ Aroclor 1248	0.160000E+04	UG/KG	AD565
414001	0705457	19850916	AM AA	0	12	K1811	PCB Aroclor 1248	[illegible]	[illegible]	[illegible]

UNITED STATED COAST GUARD SAMPLING PROGRAM: 1982
LOWER ACUSHNET RIVER ESTUARY
PILOT STUDY AREA
SUMMARY OF AROCHLOR DATA

SAMPLE NO.	DEPTH (INCHES)	PCBs (PPM)
1	0-8	127
2	0-11	185
3	0-9.5	165
4	0-4	47.5
5	0-6.5	82.5
6	0-9	30
7	0-6.5	45
8	0-9	198
9	0-9	168
10	0-8	70

GROUP 4 DATA

SELECTED PARAMETERS FROM NUS/GZA STUDY

LALALA T_T_T_ D_M_S	LONLOLO _D N_N_ M_S	DATE_ SAMPLED	MA TE RI AL	FR AC TI ON	DE PT H_ T	DE PT H_ B	ORIG_ STATION	PARAMETER	CONC	UNITS	LAB_ID
413638	0705418	1131986	AM	AA	0	6	171	PCB - Aroclor 1254	0.800000E+03	UG/KG	AE216
413638	0705418	1131986	AM	AA	0	6	171	PCB - Aroclor 1242	0.160000E+03	UG/KG	AE216
413757	0705426	12311985	AM	AA	0	6	90	PCB - Aroclor 1254	0.250000E+04	UG/KG	AE501
413757	0705426	12311985	AM	AA	0	6	90	PCB - Aroclor 1248	0.230000E+04	UG/KG	AE501
413757	0705418	12311985	AM	AA	0	6	91	PCB - Aroclor 1254	0.280000E+04	UG/KG	AE502
413757	0705418	12311985	AM	AA	0	6	91	PCB - Aroclor 1248	0.130000E+04	UG/KG	AE502
413751	0705508	12301985	AM	AA	0	6	92	PCB - Aroclor 1254	0.350000E+03	UG/KG	AE503
413751	0705508	12301985	AM	AA	0	6	92	PCB - Aroclor 1248	0.920000E+03	UG/KG	AE503
413752	0705501	12301985	AM	AA	0	6	93	PCB - Aroclor 1254	0.580000E+04	UG/KG	AE504
413752	0705501	12301985	AM	AA	0	6	93	PCB - Aroclor 1248	0.740000E+04	UG/KG	AE504
413752	0705455	12311985	AM	AA	0	6	94	PCB - Aroclor 1254	0.350000E+04	UG/KG	AE505
413752	0705455	12311985	AM	AA	0	6	94	PCB - Aroclor 1248	0.380000E+04	UG/KG	AE505
413751	0705446	12311985	AM	AA	0	6	95	PCB - Aroclor 1254	0.750000E+03	UG/KG	AE506
413751	0705446	12311985	AM	AA	0	6	95	PCB - Aroclor 1248	0.120000E+04	UG/KG	AE506
413751	0705419	12281985	AM	AA	0	6	99	PCB - Aroclor 1254	0.490000E+04	UG/KG	AE507
413751	0705419	12281985	AM	AA	0	6	99	PCB - Aroclor 1248	0.540000E+04	UG/KG	AE507
413752	0705414	12281985	AM	AA	0	6	100	PCB - Aroclor 1254	0.290000E+03	UG/KG	AE508
413752	0705414	12281985	AM	AA	0	6	100	PCB - Aroclor 1248	0.380000E+03	UG/KG	AE508
413746	0705506	12301985	AM	AA	0	6	101	PCB - Aroclor 1254	0.480000E+03	UG/KG	AE509
413746	0705506	12301985	AM	AA	0	6	101	PCB - Aroclor 1248	0.510000E+03	UG/KG	AE509
413747	0705502	12301985	AM	AA	0	6	102	PCB - Aroclor 1254	0.120000E+05	UG/KG	AE510
413747	0705502	12301985	AM	AA	0	6	102	PCB - Aroclor 1248	0.560000E+04	UG/KG	AE510
413746	0705455	12301985	AM	AA	0	6	103	PCB - Aroclor 1254		UG/KG	AE511
413746	0705455	12301985	AM	AA	0	6	103	PCB - Aroclor 1248		UG/KG	AE511
413742	0705501	12311985	AM	AA	0	6	109	PCB - Aroclor 1254	0.640000E+03	UG/KG	AE512
413742	0705501	12311985	AM	AA	0	6	109	PCB - Aroclor 1248	0.840000E+03	UG/KG	AE512
413748	0705420	12271985	AM	AA	0	6	108	PCB - Aroclor 1254	0.140000E+04	UG/KG	AE513
413748	0705420	12271985	AM	AA	0	6	108	PCB - Aroclor 1248	0.160000E+04	UG/KG	AE513
413742	0705425	12311985	AM	AA	0	6	114	PCB - Aroclor 1254	0.180000E+03	UG/KG	AE514
413742	0705425	12311985	AM	AA	0	6	114	PCB - Aroclor 1248	0.380000E+03	UG/KG	AE514
413741	0705419	12271985	AM	AA	0	6	115	PCB - Aroclor 1254	0.150000E+04	UG/KG	AE515
413741	0705419	12271985	AM	AA	0	6	115	PCB - Aroclor 1248	0.140000E+04	UG/KG	AE515
413741	0705414	12271985	AM	AA	0	6	116	PCB - Aroclor 1254	0.750000E+03	UG/KG	AE516
413741	0705414	12271985	AM	AA	0	6	116	PCB - Aroclor 1248	0.660000E+03	UG/KG	AE516
413736	0705455	12241985	AM	AA	0	6	117	PCB - Aroclor 1254	0.130000E+04	UG/KG	AE517
413736	0705455	12241985	AM	AA	0	6	117	PCB - Aroclor 1248	0.130000E+04	UG/KG	AE517
413736	0705447	12241985	AM	AA	0	6	118	PCB - Aroclor 1254	0.120000E+04	UG/KG	AE518
413736	0705447	12241985	AM	AA	0	6	118	PCB - Aroclor 1248	0.150000E+04	UG/KG	AE518
413736	0705441	12231985	AM	AA	0	6	119	PCB - Aroclor 1254	0.540000E+03	UG/KG	AE519
413736	0705441	12231985	AM	AA	0	6	119	PCB - Aroclor 1248	0.190000E+04	UG/KG	AE519

413737	0705435	12231985	AM	AA	0	6	120	PCB - Aroclor 1254	0.990000E+03	UG/KG	AE520
413737	0705435	12231985	AM	AA	0	6	120	PCB - Aroclor 1248	0.260000E+04	UG/KG	AE520
413736	0705426	12281985	AM	AA	0	6	121	PCB - Aroclor 1254	0.230000E+03	UG/KG	AE521
413736	0705426	12281985	AM	AA	0	6	121	PCB - Aroclor 1248	0.290000E+03	UG/KG	AE521
413736	0705421	12271985	AM	AA	0	6	122	PCB - Aroclor 1254	0.100000E+04	UG/KG	AE522
413736	0705421	12271985	AM	AA	0	6	122	PCB - Aroclor 1248	0.150000E+04	UG/KG	AE522
413736	0705414	12271985	AM	AA	0	6	123	PCB - Aroclor 1254	0.150000E+03	UG/KG	AE523
413736	0705414	12271985	AM	AA	0	6	123	PCB - Aroclor 1248	0.270000E+03	UG/KG	AE523
413732	0705452	12201985	AM	AA	0	6	124	PCB - Aroclor 1254	0.980000E+03	UG/KG	AE524
413732	0705452	12201985	AM	AA	0	6	124	PCB - Aroclor 1248	0.280000E+04	UG/KG	AE524
413732	0705448	12231985	AM	AA	0	6	125	PCB - Aroclor 1254	0.130000E+04	UG/KG	AE525
413732	0705448	12231985	AM	AA	0	6	125	PCB - Aroclor 1248	0.850000E+03	UG/KG	AE525
413731	0705441	12231985	AM	AA	0	6	126	PCB - Aroclor 1254	0.530000E+03	UG/KG	AE526
413731	0705441	12231985	AM	AA	0	6	126	PCB - Aroclor 1248		UG/KG	AE526
413732	0705433	12231985	AM	AA	0	6	127	PCB - Aroclor 1254	0.160000E+04	UG/KG	AE527
413732	0705433	12231985	AM	AA	0	6	127	PCB - Aroclor 1248	0.220000E+04	UG/KG	AE527
413731	0705428	12231985	AM	AA	0	6	128	PCB - Aroclor 1254	0.230000E+04	UG/KG	AE528
413731	0705428	12231985	AM	AA	0	6	128	PCB - Aroclor 1248	0.280000E+04	UG/KG	AE528
413731	0705422	12271985	AM	AA	0	6	129	PCB - Aroclor 1254	0.800000E+03	UG/KG	AE529
413731	0705422	12271985	AM	AA	0	6	129	PCB - Aroclor 1248	0.180000E+04	UG/KG	AE529
413731	0705414	12271985	AM	AA	0	6	130	PCB - Aroclor 1254	0.120000E+03	UG/KG	AE530
413731	0705414	12271985	AM	AA	0	6	130	PCB - Aroclor 1248	0.170000E+03	UG/KG	AE530
413726	0705452	12181985	AM	AA	0	6	131	PCB - Aroclor 1254	0.270000E+04	UG/KG	AE531
413726	0705452	12181985	AM	AA	0	6	131	PCB - Aroclor 1248	0.760000E+04	UG/KG	AE531
413727	0705447	12201985	AM	AA	0	6	132	PCB - Aroclor 1254	0.300000E+04	UG/KG	AE532
413727	0705447	12201985	AM	AA	0	6	132	PCB - Aroclor 1242	0.250000E+04	UG/KG	AE532
413727	0705442	12201985	AM	AA	0	6	133	PCB - Aroclor 1254	0.440000E+03	UG/KG	AE533
413727	0705442	12201985	AM	AA	0	6	133	PCB - Aroclor 1242	0.610000E+03	UG/KG	AE533
413728	0705432	12201985	AM	AA	0	6	134	PCB - Aroclor 1254	0.250000E+04	UG/KG	AE534
413728	0705432	12201985	AM	AA	0	6	134	PCB - Aroclor 1248	0.230000E+04	UG/KG	AE534
413727	0705427	12201985	AM	AA	0	6	135	PCB - Aroclor 1254	0.200000E+03	UG/KG	AE535
413727	0705427	12201985	AM	AA	0	6	135	PCB - Aroclor 1242	0.360000E+03	UG/KG	AE535
413726	0705419	12281985	AM	AA	0	6	136	PCB - Aroclor 1254	0.250000E+03	UG/KG	AE536
413726	0705419	12281985	AM	AA	0	6	136	PCB - Aroclor 1248	0.420000E+03	UG/KG	AE536
413727	0705413	12281985	AM	AA	0	6	137	PCB - Aroclor 1254		UG/KG	AE537
413727	0705413	12281985	AM	AA	0	6	137	PCB - Aroclor 1242		UG/KG	AE537
413721	0705452	12191985	AM	AA	0	6	138	PCB - Aroclor 1242	0.140000E+03	UG/KG	AE538
413721	0705447	12191985	AM	AA	0	6	139	PCB - Aroclor 1254	0.270000E+04	UG/KG	AE539
413721	0705447	12191985	AM	AA	0	6	139	PCB - Aroclor 1242	0.230000E+04	UG/KG	AE539
413722	0705443	12191985	AM	AA	0	6	140	PCB - Aroclor 1254	0.180000E+04	UG/KG	AE540
413722	0705443	12191985	AM	AA	0	6	140	PCB - Aroclor 1242	0.250000E+04	UG/KG	AE540
413723	0705416	12191985	AM	AA	0	6	143	PCB - Aroclor 1242		UG/KG	AE541
413716	0705450	12191985	AM	AA	0	6	144	PCB - Aroclor 1254	0.100000E+04	UG/KG	AE542
413716	0705450	12191985	AM	AA	0	6	144	PCB - Aroclor 1242	0.180000E+04	UG/KG	AE542
413717	0705444	12191985	AM	AA	0	6	145	PCB - Aroclor 1254	0.120000E+04	UG/KG	AE543
413717	0705444	12191985	AM	AA	0	6	145	PCB - Aroclor 1242	0.150000E+04	UG/KG	AE543

413715	0705450	12191985	AM	AA	0	6	149	PCB - Aroclor 1242	0.290000E+03	UG/KG	AE544
413751	0705426	12311985	AM	AA	0	6	98	PCB - Aroclor 1254	0.680000E+03	UG/KG	AE545
413751	0705426	12311985	AM	AA	0	6	98	PCB - Aroclor 1248	0.930000E+03	UG/KG	AE545
		1091986	AM	AO	NA	NA		PCB - Aroclor 1254		UG/KG	AE546
		1091986	AM	AO	NA	NA		PCB - Aroclor 1248		UG/KG	AE546
413731	0705428	12231985	AM	AA	0	6	128	PCB - Aroclor 1254	0.150000E+03	UG/KG	AE547
413731	0705428	12231985	AM	AA	0	6	128	PCB - Aroclor 1248	0.800000E+03	UG/KG	AE547
		1091986	AM	AA	NA	NA		PCB - Aroclor 1254		UG/KG	AE548
		1091986	AM	AA	NA	NA		PCB - Aroclor 1248		UG/KG	AE548
413721	0705452	12191985	AM	AA	0	6	138	PCB - Aroclor 1242		UG/KG	AE549
		1091986	AM	AA	0	6		PCB - Aroclor 1242	0.120000E+03	UG/KG	AE550
413727	0705427	12201985	AM	AA	12	18	135	PCB - Aroclor 1254	0.230000E+03	UG/KG	AE801
413727	0705427	12201985	AM	AA	12	18	135	PCB - Aroclor 1242	0.340000E+03	UG/KG	AE801
413721	0705452	12191985	AM	AA	12	18	138	PCB - Aroclor 1254	0.430000E+03	UG/KG	AE803
413721	0705452	12191985	AM	AA	12	18	138	PCB - Aroclor 1242	0.280000E+03	UG/KG	AE803
413715	0705450	12191985	AM	AA	12	18	149	PCB - Aroclor 1254	0.980000E+03	UG/KG	AE805
413715	0705450	12191985	AM	AA	12	18	149	PCB - Aroclor 1242	0.200000E+04	UG/KG	AE805
413715	0705450	12191985	AM	AA	24	30	149	PCB - Aroclor 1254	0.210000E+03	UG/KG	AE806
413715	0705450	12191985	AM	AA	24	30	149	PCB - Aroclor 1242		UG/KG	AE806
413711	0705445	12301985	AM	AA	0	6	150	PCB - Aroclor 1254	0.490000E+03	UG/KG	AE808
413711	0705445	12301985	AM	AA	0	6	150	PCB - Aroclor 1242	0.280000E+04	UG/KG	AE808
413711	0705445	12301985	AM	AA	12	18	150	PCB - Aroclor 1254	0.880000E+03	UG/KG	AE808
413711	0705445	12301985	AM	AA	12	18	150	PCB - Aroclor 1242	0.320000E+04	UG/KG	AE809
413711	0705445	12301985	AM	AA	24	30	150	PCB - Aroclor 1254	0.150000E+03	UG/KG	AE810
413711	0705445	12301985	AM	AA	24	30	150	PCB - Aroclor 1242	0.440000E+03	UG/KG	AE810
413711	0705445	12301985	AM	AA	36	42	150	PCB - Aroclor 1254	0.930000E+02	UG/KG	AE811
413711	0705445	12301985	AM	AA	36	42	150	PCB - Aroclor 1242	0.920000E+02	UG/KG	AE811
413711	0705445	12301985	AM	AA	42	48	150	PCB - Aroclor 1242	0.820000E+02	UG/KG	AE812
413712	0705427	1031986	AM	AA	0	6	153	PCB - Aroclor 1254	0.160000E+05	UG/KG	AE813
413712	0705427	1031986	AM	AA	0	6	153	PCB - Aroclor 1242	0.650000E+05	UG/KG	AE813
413712	0705427	1031986	AM	AA	12	18	153	PCB - Aroclor 1254	0.290000E+03	UG/KG	AE814
413712	0705427	1031986	AM	AA	12	18	153	PCB - Aroclor 1242		UG/KG	AE814
413702	0705439	1091986	AM	AA	0	6	159	PCB - Aroclor 1254	0.190000E+05	UG/KG	AE816
413702	0705439	1091986	AM	AA	0	6	159	PCB - Aroclor 1242	0.390000E+05	UG/KG	AE816
413701	0705432	1031986	AM	AA	0	6	160	PCB - Aroclor 1254	0.130000E+05	UG/KG	AE817
413701	0705432	1031986	AM	AA	0	6	160	PCB - Aroclor 1242	0.380000E+05	UG/KG	AE817
413657	0705439	1091986	AM	AA	0	6	162	PCB - Aroclor 1254	0.100000E+04	UG/KG	AE818
413657	0705439	1091986	AM	AA	0	6	162	PCB - Aroclor 1242	0.300000E+04	UG/KG	AE818
413817	0705453	1041986	AM	AA	0	6	58	PCB - Aroclor 1254	0.530000E+04	UG/KG	AE819
413817	0705453	1041986	AM	AA	0	6	58	PCB - Aroclor 1242	0.420000E+04	UG/KG	AE819
413652	0705425	1101986	AM	AA	0	6	166	PCB - Aroclor 1254	0.880000E+03	UG/KG	AE820
413652	0705425	1101986	AM	AA	0	6	166	PCB - Aroclor 1242	0.100000E+04	UG/KG	AE820
413812	0705506	1061986	AM	AA	0	6	64	PCB - Aroclor 1254	0.870000E+04	UG/KG	AE825
413812	0705506	1061986	AM	AA	0	6	64	PCB - Aroclor 1254	0.140000E+05	UG/KG	AE826
413722	0705432	1171986	AM	AA	0	6	141	PCB - Aroclor 1254	0.580000E+03	UG/KG	AE827
413717	0705439	1161986	AM	AA	0	6	146	PCB - Aroclor 1254	0.220000E+03	UG/KG	AE828

413717	0705432	1171986	AM	AA	0	6	147	PCB - Aroclor 1254	0.130000E+03	UG/KG	AE829
413707	0705445	1171986	AM	AA	0	6	154	PCB - Aroclor 1254	0.120000E+05	UG/KG	AE830
413707	0705433	1171986	AM	AA	0	6	156	PCB - Aroclor 1254	0.370000E+04	UG/KG	AE831
413707	0705427	1171986	AM	AA	0	6	157	PCB - Aroclor 1254	0.190000E+04	UG/KG	AE832
413702	0705424	1031986	AM	AA	0	6	161	PCB - Aroclor 1254	0.280000E+04	UG/KG	AE833
413657	0705424	1101986	AM	AA	0	6	164	PCB - Aroclor 1254	0.120000E+04	UG/KG	AE834
413652	0705430	1091986	AM	AA	0	6	165	PCB - Aroclor 1254	0.740000E+04	UG/KG	AE835
413647	0705426	1101986	AM	AA	0	6	167	PCB - Aroclor 1254	0.110000E+04	UG/KG	AE836
413643	0705424	1131986	AM	AA	0	6	169	PCB - Aroclor 1254	0.110000E+04	UG/KG	AE837
413642	0705419	1161986	AM	AA	0	6	170	PCB - Aroclor 1254	0.670000E+04	UG/KG	AE838
413827	0705512	2051986	AM	AA	24	36	45	PCB - Aroclor 1254	0.700000E+03	UG/KG	AE851
413827	0705512	2051986	AM	AA	24	36	45	PCB _ Aroclor 1248	0.560000E+03	UG/KG	AE851
413827	0705506	2061986	AM	AA	0	6	46	PCB - Aroclor 1254	0.120000E+03	UG/KG	AE852
413827	0705506	2061986	AM	AA	0	6	46	PCB _ Aroclor 1248	0.110000E+04	UG/KG	AE852
413820	0705508	2061986	AM	AA	0	6	50	PCB - Aroclor 1254	0.200000E+04	UG/KG	AE853
413820	0705508	2061986	AM	AA	0	6	50	PCB _ Aroclor 1248	0.280000E+04	UG/KG	AE853
413822	0705507	2061986	AM	AA	0	6	51	PCB - Aroclor 1254	0.250000E+04	UG/KG	AE854
413822	0705507	2061986	AM	AA	0	6	51	PCB _ Aroclor 1248	0.420000E+04	UG/KG	AE854
413805	0705452	1291986	AM	AA	0	6	74	PCB - Aroclor 1254	0.110000E+04	UG/KG	AE855
413805	0705452	1291986	AM	AA	0	6	74	PCB _ Aroclor 1248	0.100000E+04	UG/KG	AE855
413815	0705429	1291986	AM	AA	0	6	70	PCB - Aroclor 1254	0.170000E+04	UG/KG	AE856
413815	0705429	1291986	AM	AA	0	6	70	PCB _ Aroclor 1248	0.540000E+03	UG/KG	AE856
413856	0705506	1291986	AM	AA	0	6	10	PCB - Aroclor 1254	0.130000E+04	UG/KG	AE857
413856	0705506	1291986	AM	AA	0	6	10	PCB _ Aroclor 1248	0.170000E+04	UG/KG	AE857
413801	0705446	1291986	AM	AA	0	6	81	PCB - Aroclor 1254	0.230000E+04	UG/KG	AE858
413801	0705446	1291986	AM	AA	0	6	81	PCB _ Aroclor 1248	0.240000E+04	UG/KG	AE858
413756	0705451	1291986	AM	AA	0	6	86	PCB - Aroclor 1254	0.140000E+04	UG/KG	AE859
413756	0705451	1291986	AM	AA	0	6	86	PCB _ Aroclor 1248	0.210000E+04	UG/KG	AE859
413756	0705445	1291986	AM	AA	0	6	87	PCB - Aroclor 1254	0.920000E+03	UG/KG	AE860
413756	0705445	1291986	AM	AA	0	6	87	PCB _ Aroclor 1248	0.130000E+04	UG/KG	AE860
413913	0705509	1211986	AM	AA	12	18	1	PCB - Aroclor 1254	0.240000E+04	UG/KG	AE861
413913	0705509	1211986	AM	AA	12	18	1	PCB _ Aroclor 1248	0.250000E+04	UG/KG	AE861
413913	0705509	1211986	AM	AA	24	30	1	PCB - Aroclor 1254	0.160000E+03	UG/KG	AE862
413913	0705509	1211986	AM	AA	24	30	1	PCB _ Aroclor 1248	0.140000E+03	UG/KG	AE862
413909	0705506	1311986	AM	AA	12	18	5	PCB - Aroclor 1254	0.140000E+02	UG/KG	AE863
413909	0705506	1311986	AM	AA	12	18	5	PCB _ Aroclor 1248	0.240000E+02	UG/KG	AE863
413826	0705439		AM	AA	24	36	48	PCB - Aroclor 1254	0.120000E+04	UG/KG	AE864
413826	0705439		AM	AA	24	36	48	PCB _ Aroclor 1248	0.910000E+03	UG/KG	AE864
		2041986	AM	AA	0	6	0	PCB - Aroclor 1254		UG/KG	AE865
		2041986	AM	AA	0	6	0	PCB _ Aroclor 1248		UG/KG	AE865
413841	0705518	2051986	AM	AA	0	6	23	PCB - Aroclor 1254		UG/KG	AE866
413841	0705518	2051986	AM	AA	0	6	23	PCB _ Aroclor 1248		UG/KG	AE866
413830	0705451	1311986	AM	AA	0	6	47	PCB - Aroclor 1254	0.290000E+04	UG/KG	AE869
413830	0705451	1311986	AM	AA	0	6	47	PCB _ Aroclor 1248	0.130000E+04	UG/KG	AE869
413830	0705451	1311986	AM	AA	24	30	47	PCB - Aroclor 1254	0.830000E+03	UG/KG	AE871
413757	0705459	1291986	AM	AA	0	6	85	PCB - Aroclor 1254		UG/KG	AE872

413757	0705459	1291986	AM AA	0	6	85	PCB - Aroclor 1248		UG/KG	AE872
413821	0705446	1041986	AM AA	0	6	52	PCB - Aroclor 1254	0.670000E+03	UG/KG	AF110
413821	0705446	1041986	AM AA	0	6	52	PCB - Aroclor 1248	0.640000E+03	UG/KG	AF110
413821	0705433	1041986	AM AA	0	6	54	PCB - Aroclor 1254	0.200000E+04	UG/KG	AF111
413821	0705433	1041986	AM AA	0	6	54	PCB - Aroclor 1248	0.220000E+04	UG/KG	AF111
413815	0705518	1061986	AM AA	0	6	55	PCB - Aroclor 1254	0.410000E+03	UG/KG	AF112
413815	0705518	1061986	AM AA	0	6	55	PCB - Aroclor 1248	0.490000E+03	UG/KG	AF112
413817	0705506	1061986	AM AA	0	6	56	PCB - Aroclor 1254	0.170000E+04	UG/KG	AF113
413817	0705506	1061986	AM AA	0	6	56	PCB - Aroclor 1248	0.190000E+04	UG/KG	AF113
413817	0705446	1061986	AM AA	0	6	59	PCB - Aroclor 1254	0.720000E+03	UG/KG	AF114
413817	0705446	1061986	AM AA	0	6	59	PCB - Aroclor 1248	0.850000E+03	UG/KG	AF114
413817	0705441	1021986	AM AA	0	6	60	PCB - Aroclor 1254	0.210000E+04	UG/KG	AF115
413817	0705441	1021986	AM AA	0	6	60	PCB - Aroclor 1248	0.260000E+04	UG/KG	AF115
413817	0705434	1021986	AM AA	0	6	61	PCB - Aroclor 1254	0.270000E+04	UG/KG	AF116
413817	0705434	1021986	AM AA	0	6	61	PCB - Aroclor 1248	0.260000E+04	UG/KG	AF116
413817	0705434	1021986	AM AA	0	6	61	PCB - Aroclor 1254	0.440000E+04	UG/KG	AF117
413817	0705434	1021986	AM AA	0	6	61	PCB - Aroclor 1248	0.440000E+04	UG/KG	AF117
413817	0705429	1021986	AM AA	0	6	62	PCB - Aroclor 1254		UG/KG	AF118
413817	0705429	1021986	AM AA	0	6	62	PCB - Aroclor 1248	0.140000E+03	UG/KG	AF118
413812	0705500	1061986	AM AA	0	6	65	PCB - Aroclor 1254	0.140000E+04	UG/KG	AF119
413812	0705500	1061986	AM AA	0	6	65	PCB - Aroclor 1248	0.170000E+04	UG/KG	AF119
413821	0705439	1041986	AM AA	0	6	53	PCB - Aroclor 1254	0.170000E+04	UG/KG	AF145
413821	0705439	1041986	AM AA	0	6	53	PCB - Aroclor 1242	0.730000E+03	UG/KG	AF145
413821	0705439	1041986	AM AA	12	18	53	PCB - Aroclor 1254	0.650000E+03	UG/KG	AF146
413821	0705439	1041986	AM AA	12	18	53	PCB - Aroclor 1242	0.440000E+03	UG/KG	AF146
413821	0705439	1041986	AM AA	24	30	53	PCB - Aroclor 1254		UG/KG	AF147
413821	0705439	1041986	AM AA	24	30	53	PCB - Aroclor 1242	0.110000E+03	UG/KG	AF147
413812	0705513	1061986	AM AA	0	6	63	PCB - Aroclor 1254	0.270000E+04	UG/KG	AF148
413812	0705513	1061986	AM AA	0	6	63	PCB - Aroclor 1242	0.230000E+04	UG/KG	AF148
413812	0705513	1061986	AM AA	12	18	63	PCB - Aroclor 1254	0.870000E+03	UG/KG	AF149
413812	0705513	1061986	AM AA	12	18	63	PCB - Aroclor 1242	0.360000E+03	UG/KG	AF149
413812	0705513	1061986	AM AA	24	30	63	PCB - Aroclor 1254	0.710000E+03	UG/KG	AF150
413812	0705513	1061986	AM AA	24	30	63	PCB - Aroclor 1242	0.490000E+03	UG/KG	AF150
413812	0705513	1061986	AM AA	36	42	63	PCB - Aroclor 1254	0.210000E+03	UG/KG	AF151
413812	0705513	1061986	AM AA	36	42	63	PCB - Aroclor 1242	0.160000E+03	UG/KG	AF151
413812	0705453	1061986	AM AA	0	6	66	PCB - Aroclor 1254	0.780000E+04	UG/KG	AF152
413812	0705453	1061986	AM AA	0	6	66	PCB - Aroclor 1242	0.740000E+04	UG/KG	AF152
413812	0705453	1061986	AM AA	12	18	66	PCB - Aroclor 1254	0.420000E+04	UG/KG	AF153
413812	0705453	1061986	AM AA	12	18	66	PCB - Aroclor 1242	0.270000E+04	UG/KG	AF153
413812	0705453	1061986	AM AA	24	30	66	PCB - Aroclor 1254		UG/KG	AF154
413812	0705453	1061986	AM AA	24	30	66	PCB - Aroclor 1242		UG/KG	AF154
413814	0705435	1021986	AM AA	0	6	69	PCB - Aroclor 1254	0.140000E+04	UG/KG	AF155
413814	0705435	1021986	AM AA	0	6	69	PCB - Aroclor 1242	0.830000E+03	UG/KG	AF155
413814	0705435	1021986	AM AA	12	18	69	PCB - Aroclor 1254	0.330000E+03	UG/KG	AF156
413814	0705435	1021986	AM AA	12	18	69	PCB - Aroclor 1242	0.200000E+03	UG/KG	AF156
413814	0705435	1021986	AM AA	24	30	69	PCB - Aroclor 1254		UG/KG	AF157

413814	0705435	1021986	AM	AA	24	30	69	PCB - Aroclor 1242		UG/KG	AF157
413722	0705427	1031986	AM	AA	0	6	142	PCB - Aroclor 1254	0.360000E+04	UG/KG	AF158
413722	0705427	1031986	AM	AA	0	6	142	PCB - Aroclor 1242	0.330000E+04	UG/KG	AF158
413722	0705427	1031986	AM	AA	12	18	142	PCB - Aroclor 1254	0.290000E+04	UG/KG	AF159
413722	0705427	1031986	AM	AA	12	18	142	PCB - Aroclor 1242	0.190000E+04	UG/KG	AF159
413722	0705427	1031986	AM	AA	24	30	142	PCB - Aroclor 1254		UG/KG	AF160
413722	0705427	1031986	AM	AA	24	30	142	PCB - Aroclor 1242		UG/KG	AF160
413702	0705445	1091986	AM	AA	0	6	158	PCB - Aroclor 1254	0.110000E+04	UG/KG	AF161
413702	0705445	1091986	AM	AA	0	6	158	PCB - Aroclor 1242	0.170000E+04	UG/KG	AF161
413702	0705445	1091986	AM	AA	12	18	158	PCB - Aroclor 1254	0.470000E+03	UG/KG	AF162
413702	0705445	1091986	AM	AA	12	18	158	PCB - Aroclor 1242	0.680000E+03	UG/KG	AF162
413702	0705445	1091986	AM	AA	24	36	158	PCB - Aroclor 1254	0.390000E+03	UG/KG	AF163
413702	0705445	1091986	AM	AA	24	36	158	PCB - Aroclor 1242	0.500000E+03	UG/KG	AF163
413657	0705432	1091986	AM	AA	0	6	163	PCB - Aroclor 1254	0.310000E+04	UG/KG	AF164
413657	0705432	1091986	AM	AA	0	6	163	PCB - Aroclor 1242	0.480000E+04	UG/KG	AF164
413657	0705432	1091986	AM	AA	12	18	163	PCB - Aroclor 1254		UG/KG	AF165
413657	0705432	1091986	AM	AA	12	18	163	PCB - Aroclor 1242	0.170000E+03	UG/KG	AF165
413657	0705432	1091986	AM	AA	24	30	163	PCB - Aroclor 1254	0.260000E+03	UG/KG	AF166
413657	0705432	1091986	AM	AA	24	30	163	PCB - Aroclor 1242	0.200000E+03	UG/KG	AF166
413657	0705432	1091986	AM	AA	30	36	163	PCB - Aroclor 1254		UG/KG	AF167
413657	0705432	1091986	AM	AA	30	36	163	PCB - Aroclor 1242		UG/KG	AF167
		1161986	AM	AA	0	6	0	PCB - Aroclor 1254		UG/KG	AF168
		1161986	AM	AA	0	6	0	PCB - Aroclor 1242		UG/KG	AF168
413814	0705435	1021986	AM	AA	0	6	69	PCB - Aroclor 1254	0.130000E+04	UG/KG	AF169
413814	0705435	1021986	AM	AA	0	6	69	PCB - Aroclor 1242	0.830000E+03	UG/KG	AF169
413816	0705459	1071986	AM	AA	0	6	57	PCB - Aroclor 1254	0.280000E+04	UG/KG	AF170
413816	0705459	1071986	AM	AA	0	6	57	PCB - Aroclor 1242	0.240000E+04	UG/KG	AF170
413801	0705506	1101986	AM	AA	0	6	78	PCB - Aroclor 1254	0.580000E+04	UG/KG	AF171
413801	0705506	1101986	AM	AA	0	6	78	PCB - Aroclor 1242	0.240000E+04	UG/KG	AF171
413736	0705455	12241985	AM	AA	6	12	117	PCB - Aroclor 1254	0.720000E+03	UG/KG	AF174
413736	0705455	12241985	AM	AA	6	12	117	PCB - Aroclor 1242	0.490000E+03	UG/KG	AF174
413757	0705459	1291986	AM	AA	12	18	85	PCB - Aroclor 1254		UG/KG	AF176
413757	0705459	1291986	AM	AA	24	30	85	PCB - Aroclor 1254		UG/KG	AF177
413835	0705437	2051986	AM	AA	6	12	36	PCB - Aroclor 1254	0.780000E+02	UG/KG	AF180
413835	0705437	2051986	AM	AA	6	12	36	PCB - Aroclor 1248	0.170000E+03	UG/KG	AF180
413717	0705444	12191985	AM	AA	6	18	145	PCB - Aroclor 1254	0.420000E+03	UG/KG	AF182
413717	0705444	12191985	AM	AA	24	36	145	PCB - Aroclor 1254	0.130000E+03	UG/KG	AF183
413707	0705445	1171986	AM	AA	6	12	154	PCB - Aroclor 1254	0.610000E+03	UG/KG	AF184
413707	0705445	1171986	AM	AA	6	12	154	PCB - Aroclor 1248	0.270000E+04	UG/KG	AF184
413707	0705445	1171986	AM	AA	18	24	154	PCB - Aroclor 1254	0.550000E+03	UG/KG	AF185
413707	0705445	1171986	AM	AA	18	24	154	PCB - Aroclor 1254	0.250000E+03	UG/KG	AF186
413813	0705446	1061986	AM	AA	0	6	67	PCB - Aroclor 1254	0.380000E+03	UG/KG	AF201
413813	0705446	1061986	AM	AA	0	6	67	PCB - Aroclor 1248	0.410000E+03	UG/KG	AF201
413813	0705443	1021986	AM	AA	0	6	68	PCB - Aroclor 1254		UG/KG	AF202
413813	0705443	1021986	AM	AA	0	6	68	PCB - Aroclor 1248		UG/KG	AF202
413815	0705429	1021986	AM	AA	0	6	70	PCB - Aroclor 1254		UG/KG	AF203

413815	0705429	1021986	AM	AA	0	6	70	PCB _ Aroclor 1248		UG/KG	AF203
413808	0705511	1071986	AM	AA	0	6	71	PCB - Aroclor 1254	0.200000E+04	UG/KG	AF204
413808	0705511	1071986	AM	AA	0	6	71	PCB _ Aroclor 1248	0.270000E+04	UG/KG	AF204
413806	0705445	1141986	AM	AA	0	6	75	PCB - Aroclor 1254	0.240000E+04	UG/KG	AF205
413806	0705445	1141986	AM	AA	0	6	75	PCB _ Aroclor 1248	0.160000E+04	UG/KG	AF205
413806	0705439	1071986	AM	AA	0	6	76	PCB - Aroclor 1254	0.170000E+04	UG/KG	AF206
413806	0705439	1071986	AM	AA	0	6	76	PCB _ Aroclor 1248	0.190000E+04	UG/KG	AF206
413806	0705433	1071986	AM	AA	0	6	77	PCB - Aroclor 1254	0.390000E+03	UG/KG	AF207
413806	0705433	1071986	AM	AA	0	6	77	PCB _ Aroclor 1248	0.410000E+03	UG/KG	AF207
413801	0705459	1101986	AM	AA	0	6	79	PCB - Aroclor 1254	0.160000E+04	UG/KG	AF208
413801	0705459	1101986	AM	AA	0	6	79	PCB _ Aroclor 1248	0.730000E+03	UG/KG	AF208
413802	0705439	1071986	AM	AA	0	6	82	PCB - Aroclor 1254	0.460000E+03	UG/KG	AF209
413802	0705439	1071986	AM	AA	0	6	82	PCB _ Aroclor 1248	0.340000E+03	UG/KG	AF209
413801	0705433	1071986	AM	AA	0	6	83	PCB - Aroclor 1254	0.810000E+03	UG/KG	AF210
413801	0705433	1071986	AM	AA	0	6	83	PCB _ Aroclor 1248	0.560000E+03	UG/KG	AF210
413756	0705505	1091986	AM	AA	0	6	84	PCB - Aroclor 1254	0.130000E+04	UG/KG	AF211
413756	0705505	1091986	AM	AA	0	6	84	PCB _ Aroclor 1248	0.190000E+04	UG/KG	AF211
413712	0705433	1141986	AM	AA	0	6	151	PCB - Aroclor 1254	0.120000E+04	UG/KG	AF212
413712	0705433	1141986	AM	AA	0	6	151	PCB _ Aroclor 1248	0.100000E+04	UG/KG	AF212
413711	0705436	1031986	AM	AA	0	6	152	PCB - Aroclor 1254	0.190000E+04	UG/KG	AF213
413711	0705436	1031986	AM	AA	0	6	152	PCB _ Aroclor 1248	0.730000E+04	UG/KG	AF213
413707	0705439	1141986	AM	AA	0	6	155	PCB - Aroclor 1254	0.770000E+04	UG/KG	AF214
413707	0705439	1141986	AM	AA	0	6	155	PCB _ Aroclor 1248	0.240000E+04	UG/KG	AF214
413638	0705411	1131986	AM	AA	0	6	172	PCB - Aroclor 1254	0.770000E+04	UG/KG	AF217
413638	0705411	1101986	AM	AA	0	6	173	PCB - Aroclor 1254	0.270000E+04	UG/KG	AF218
413638	0705411	1101986	AM	AA	0	6	173	PCB - Aroclor 1242	0.100000E+04	UG/KG	AF218
413633	0705405	1131986	AM	AA	0	6	174	PCB - Aroclor 1254	0.500000E+04	UG/KG	AF219
413633	0705405	1131986	AM	AA	0	6	174	PCB - Aroclor 1242	0.220000E+04	UG/KG	AF219
413628	0705409	1131986	AM	AA	0	6	175	PCB - Aroclor 1254	0.440000E+04	UG/KG	AF220
413628	0705409	1131986	AM	AA	0	6	175	PCB - Aroclor 1242	0.120000E+04	UG/KG	AF220
413628	0705403	1161986	AM	AA	0	6	176	PCB - Aroclor 1254	0.180000E+04	UG/KG	AF221
413628	0705403	1161986	AM	AA	0	6	176	PCB - Aroclor 1242	0.110000E+04	UG/KG	AF221
413624	0705408	1161986	AM	AA	0	6	177	PCB - Aroclor 1254	0.200000E+04	UG/KG	AF222
413624	0705408	1161986	AM	AA	0	6	177	PCB - Aroclor 1242	0.190000E+04	UG/KG	AF222
413618	0705410	1161986	AM	AA	0	6	179	PCB - Aroclor 1254	0.290000E+03	UG/KG	AF223
413618	0705404	1161986	AM	AA	0	6	180	PCB - Aroclor 1254	0.330000E+03	UG/KG	AF224
413618	0705404	1161986	AM	AA	0	6	180	PCB - Aroclor 1242	0.170000E+03	UG/KG	AF224
413901	0705505	1211986	AM	AA	0	6	8	PCB - Aroclor 1254	0.260000E+04	UG/KG	AF227
413901	0705505	1211986	AM	AA	12	18	8	PCB - Aroclor 1254	0.440000E+04	UG/KG	AF228
413901	0705505	1211986	AM	AA	12	18	8	PCB - Aroclor 1242	0.740000E+04	UG/KG	AF228
413747	0705439	1181986	AM	AA	0	6	105	PCB - Aroclor 1254	0.490000E+03	UG/KG	AF229
413747	0705439	1181986	AM	AA	0	6	105	PCB - Aroclor 1242	0.170000E+03	UG/KG	AF229
413901	0705505	1211986	AM	AA	0	6	8	PCB - Aroclor 1254	0.100000E+04	UG/KG	AF232
413901	0705505	1211986	AM	AA	0	6	8	PCB - Aroclor 1242	0.880000E+04	UG/KG	AF232
413913	0705509	1311986	AM	AA	0	6	1	PCB - Aroclor 1254	0.200000E+05	UG/KG	AF234
413913	0705509	1311986	AM	AA	0	6	1	PCB - Aroclor 1242	0.160000E+05	UG/KG	AF234

413913	0705504	1311986	AM AA	0	6	2	PCB - Aroclor 1254	0.550000E+04 UG/KG	AF235
413913	0705504	1311986	AM AA	0	6	2	PCB - Aroclor 1242	0.650000E+04 UG/KG	AF235
413913	0705504	1311986	AM AA	12	18	2	PCB - Aroclor 1254	UG/KG	AF236
413913	0705504	1311986	AM AA	12	18	2	PCB - Aroclor 1242	UG/KG	AF236
413913	0705504	1311986	AM AA	24	30	2	PCB - Aroclor 1254	0.130000E+04 UG/KG	AF237
413913	0705504	1311986	AM AA	24	30	2	PCB - Aroclor 1242	0.200000E+04 UG/KG	AF237
413910	0705509	1311986	AM AA	0	6	3	PCB - Aroclor 1254	0.240000E+05 UG/KG	AF238
413910	0705509	1311986	AM AA	0	6	3	PCB - Aroclor 1242	0.340000E+05 UG/KG	AF238
413905	0705512	1311986	AM AA	0	6	4	PCB - Aroclor 1254	0.180000E+05 UG/KG	AF239
413905	0705512	1311986	AM AA	0	6	4	PCB - Aroclor 1242	0.320000E+05 UG/KG	AF239
413856	0705459	1311986	AM AA	0	6	1	PCB - Aroclor 1254	0.730000E+03 UG/KG	AF240
413856	0705459	1311986	AM AA	0	6	1	PCB - Aroclor 1242	0.550000E+03 UG/KG	AF240
413909	0705506	1311986	AM AA	0	6	5	PCB - Aroclor 1254	0.350000E+04 UG/KG	AF241
413909	0705506	1311986	AM AA	0	6	5	PCB - Aroclor 1242	0.490000E+04 UG/KG	AF241
413817	0705435	1311986	AM AA	0	6	6	PCB - Aroclor 1254	0.780000E+05 UG/KG	AF242
413817	0705435	1311986	AM AA	0	6	6	PCB - Aroclor 1242	0.200000E+05 UG/KG	AF242
413901	0705513	1311986	AM AA	0	6	7	PCB - Aroclor 1254	0.420000E+04 UG/KG	AF243
413901	0705513	1311986	AM AA	0	6	7	PCB - Aroclor 1242	0.180000E+04 UG/KG	AF243
413901	0705513	1311986	AM AA	36	42	7	PCB - Aroclor 1254	0.200000E+05 UG/KG	AF244
413901	0705513	1311986	AM AA	36	42	7	PCB - Aroclor 1242	0.170000E+05 UG/KG	AF244
413856	0705506	1311986	AM AA	0	6	10	PCB - Aroclor 1254	0.290000E+04 UG/KG	AF245
413856	0705506	1311986	AM AA	0	6	10	PCB - Aroclor 1242	0.240000E+04 UG/KG	AF245
413851	0705519	1311986	AM AA	0	6	12	PCB - Aroclor 1254	0.520000E+05 UG/KG	AF246
413851	0705519	1311986	AM AA	0	6	12	PCB - Aroclor 1242	0.490000E+05 UG/KG	AF246
413851	0705513	1311986	AM AA	0	6	13	PCB - Aroclor 1254	0.380000E+05 UG/KG	AF247
413851	0705513	1311986	AM AA	0	6	13	PCB - Aroclor 1242	0.280000E+05 UG/KG	AF247
413851	0705506	1311986	AM AA	0	6	14	PCB - Aroclor 1254	0.320000E+04 UG/KG	AF248
413851	0705506	1311986	AM AA	0	6	14	PCB - Aroclor 1242	0.190000E+04 UG/KG	AF248
413851	0705506	1311986	AM AA	12	18	14	PCB - Aroclor 1254	0.940000E+02 UG/KG	AF249
413851	0705506	1311986	AM AA	12	18	14	PCB - Aroclor 1242	UG/KG	AF249
413851	0705506	1311986	AM AA	24	30	14	PCB - Aroclor 1254	UG/KG	AF250
413851	0705506	1311986	AM AA	24	30	14	PCB - Aroclor 1242	UG/KG	AF250
413805	0705505	1311986	AM AA	0	6	72	PCB - Aroclor 1254	0.140000E+05 UG/KG	AF251
413805	0705505	1311986	AM AA	0	6	72	PCB - Aroclor 1242	0.210000E+05 UG/KG	AF251
413757	0705439	1311986	AM AA	0	6	88	PCB - Aroclor 1254	0.110000E+03 UG/KG	AF252
413757	0705439	1311986	AM AA	0	6	88	PCB - Aroclor 1242	UG/KG	AF252
413757	0705432	1311986	AM AA	0	6	89	PCB - Aroclor 1254	0.280000E+04 UG/KG	AF253
413757	0705432	1311986	AM AA	0	6	89	PCB - Aroclor 1242	UG/KG	AF253
413757	0705432	1311986	AM AA	12	18	89	PCB - Aroclor 1254	UG/KG	AF254
413757	0705432	1311986	AM AA	12	18	89	PCB - Aroclor 1242	UG/KG	AF254
413757	0705432	1311986	AM AA	24	30	89	PCB - Aroclor 1254	UG/KG	AF255
413757	0705432	1311986	AM AA	24	30	89	PCB - Aroclor 1242	UG/KG	AF255
413757	0705432	1311986	AM AA	36	42	89	PCB - Aroclor 1254	UG/KG	AF256
413757	0705432	1311986	AM AA	36	42	89	PCB - Aroclor 1242	UG/KG	AF256
413751	0705446	1201986	AM AA	0	6	95	PCB - Aroclor 1254	0.630000E+04 UG/KG	AF259
413751	0705446	1201986	AM AA	0	6	95	PCB - Aroclor 1242	0.470000E+04 UG/KG	AF259

413752	0705439	1201986	AM AA	0	6	96	PCB - Aroclor 1254	0.290000E+04	UG/KG	AF260
413752	0705439	1201986	AM AA	0	6	96	PCB - Aroclor 1242	0.640000E+03	UG/KG	AF260
413752	0705433	1201986	AM AA	0	6	97	PCB - Aroclor 1254	0.820000E+04	UG/KG	AF261
413752	0705433	1201986	AM AA	0	6	97	PCB - Aroclor 1242	0.730000E+04	UG/KG	AF261
413752	0705439	1201986	AM AA	0	6	96	PCB - Aroclor 1254	0.220000E+04	UG/KG	AF262
413752	0705439	1201986	AM AA	0	6	96	PCB - Aroclor 1242	0.390000E+03	UG/KG	AF262
413851	0705500	1231986	AM AA	0	6	15	PCB - Aroclor 1254	0.170000E+04	UG/KG	AF264
413851	0705500	1231986	AM AA	0	6	15	PCB - Aroclor 1248	0.410000E+04	UG/KG	AF264
413851	0705453	1231986	AM AA	0	6	16	PCB - Aroclor 1254	0.400000E+04	UG/KG	AF265
413851	0705453	1231986	AM AA	0	6	16	PCB - Aroclor 1248	0.690000E+04	UG/KG	AF265
413851	0705448	1231986	AM AA	0	6	17	PCB - Aroclor 1254	0.540000E+03	UG/KG	AF266
413851	0705448	1231986	AM AA	0	6	17	PCB - Aroclor 1248	0.970000E+03	UG/KG	AF266
413747	0705446	1231986	AM AA	0	6	104	PCB - Aroclor 1254	0.110000E+04	UG/KG	AF267
413747	0705446	1231986	AM AA	0	6	104	PCB - Aroclor 1248	0.230000E+04	UG/KG	AF267
413747	0705432	1181986	AM AA	0	6	106	PCB - Aroclor 1254	0.650000E+03	UG/KG	AF268
413747	0705432	1181986	AM AA	0	6	106	PCB - Aroclor 1248		UG/KG	AF268
413742	0705501	1171986	AM AA	0	6	109	PCB - Aroclor 1254	0.760000E+03	UG/KG	AF269
413742	0705501	1171986	AM AA	0	6	109	PCB - Aroclor 1248	0.100000E+04	UG/KG	AF269
413742	0705452	1171986	AM AA	0	6	110	PCB - Aroclor 1254	0.380000E+04	UG/KG	AF270
413742	0705452	1171986	AM AA	0	6	110	PCB - Aroclor 1248	0.980000E+04	UG/KG	AF270
413742	0705445	1171986	AM AA	0	6	111	PCB - Aroclor 1254	0.120000E+04	UG/KG	AF271
413742	0705445	1171986	AM AA	0	6	111	PCB - Aroclor 1248	0.210000E+04	UG/KG	AF271
413742	0705439	1171986	AM AA	0	6	112	PCB - Aroclor 1254	0.270000E+04	UG/KG	AF272
413742	0705439	1171986	AM AA	0	6	112	PCB - Aroclor 1248	0.170000E+04	UG/KG	AF272
413742	0705432	1181986	AM AA	0	6	113	PCB - Aroclor 1254	0.260000E+04	UG/KG	AF273
413742	0705432	1181986	AM AA	0	6	113	PCB - Aroclor 1248	0.170000E+04	UG/KG	AF273
413717	0705426	1171986	AM AA	0	6	148	PCB - Aroclor 1254	0.980000E+03	UG/KG	AF274
413717	0705426	1171986	AM AA	0	6	148	PCB - Aroclor 1248	0.160000E+04	UG/KG	AF274
413657	0705432	1131986	AM AA	0	6	163	PCB - Aroclor 1254	0.110000E+04	UG/KG	AF275
413657	0705432	1131986	AM AA	0	6	163	PCB - Aroclor 1248	0.110000E+04	UG/KG	AF275
413648	0705417	1131986	AM AA	24	30	168	PCB - Aroclor 1254	0.610000E+01	UG/KG	AF277
413901	0705505	1211986	AM AA	0	6	8	PCB - Aroclor 1242	0.890000E+03	UG/KG	AF277
413648	0705417	1131986	AM AA	30	36	168	PCB - Aroclor 1254	0.120000E+01	UG/KG	AF278
413623	0705404	1161986	AM AA	0	6	178	PCB - Aroclor 1254	0.820000E+03	UG/KG	AF279
413623	0705404	1161986	AM AA	0	6	178	PCB - Aroclor 1248	0.140000E+04	UG/KG	AF279
413623	0705404	1161986	AM AA	12	18	178	PCB - Aroclor 1254	0.840000E+02	UG/KG	AF280
413623	0705404	1161986	AM AA	24	30	178	PCB - Aroclor 1254	0.100000E+03	UG/KG	AF281
413851	0705500	1231986	AM AA	0	6	15	PCB - Aroclor 1254	0.330000E+04	UG/KG	AF282
413851	0705500	1231986	AM AA	0	6	15	PCB - Aroclor 1248	0.640000E+04	UG/KG	AF282
413846	0705519		AM AA	0	6	18	PCB - Aroclor 1260	0.000000E+00	UG/KG	AF284
413846	0705519		AM AA	0	6	18	PCB - Aroclor 1254	0.360000E+05	UG/KG	AF284
413846	0705519		AM AA	0	6	18	PCB - Aroclor 1221	0.000000E+00	UG/KG	AF284
413846	0705519		AM AA	0	6	18	PCB - Aroclor 1232	0.000000E+00	UG/KG	AF284
413846	0705519		AM AA	0	6	18	PCB - Aroclor 1248	0.310000E+05	UG/KG	AF284
413846	0705519		AM AA	0	6	18	PCB - Aroclor 1016	0.000000E+00	UG/KG	AF284
413846	0705519		AM AA	0	6	18	PCB - Aroclor 1242	0.000000E+00	UG/KG	AF284

413846	0705513		AM AA	0	6	19	PCB - Aroclor 1254	0.350000E+05	UG/KG	AF285
413846	0705513		AM AA	0	6	19	PCB - Aroclor 1248	0.540000E+05	UG/KG	AF285
413845	0705506		AM AA	0	6	20	PCB - Aroclor 1254	0.150000E+05	UG/KG	AF286
413845	0705506		AM AA	0	6	20	PCB - Aroclor 1248	0.140000E+05	UG/KG	AF286
413844	0705501		AM AA	0	6	21	PCB - Aroclor 1254	0.230000E+05	UG/KG	AF287
413844	0705501		AM AA	0	6	21	PCB - Aroclor 1248	0.170000E+05	UG/KG	AF287
413846	0705454		AM AA	0	6	22	PCB - Aroclor 1254	0.470000E+05	UG/KG	AF288
413846	0705454		AM AA	0	6	22	PCB - Aroclor 1248	0.500000E+05	UG/KG	AF288
413839	0705506		AM AA	0	6	25	PCB - Aroclor 1254	0.550000E+03	UG/KG	AF289
413840	0705501		AM AA	0	6	26	PCB - Aroclor 1254	0.212000E+05	UG/KG	AF290
413840	0705501		AM AA	0	6	26	PCB - Aroclor 1248	0.230000E+05	UG/KG	AF290
413840	0705501		AM AA	12	18	26	PCB - Aroclor 1254	0.600000E+03	UG/KG	AF291
413840	0705501		AM AA	24	30	26	PCB - Aroclor 1254	0.550000E+02	UG/KG	AF292
413840	0705501		AM AA	24	30	26	PCB - Aroclor 1248	0.220000E+02	UG/KG	AF292
413841	0705454		AM AA	0	6	27	PCB - Aroclor 1254	0.180000E+05	UG/KG	AF293
413841	0705454		AM AA	0	6	27	PCB - Aroclor 1248	0.170000E+05	UG/KG	AF293
413842	0705449		AM AA	0	6	28	PCB - Aroclor 1254	0.240000E+05	UG/KG	AF294
413842	0705449		AM AA	0	6	28	PCB - Aroclor 1248	0.240000E+05	UG/KG	AF294
413843	0705443		AM AA	0	6	29	PCB - Aroclor 1254	0.140000E+05	UG/KG	AF295
413843	0705443		AM AA	0	6	29	PCB - Aroclor 1248	0.110000E+05	UG/KG	AF295
413843	0705443		AM AA	12	18	29	PCB - Aroclor 1254	0.000000E+00	UG/KG	AF296
413843	0705443		AM AA	12	18	29	PCB - Aroclor 1248		UG/KG	AF296
413843	0705443		AM AA	24	30	29	PCB - Aroclor 1254	0.210000E+03	UG/KG	AF297
413843	0705443		AM AA	24	30	29	PCB - Aroclor 1248		UG/KG	AF297
413835	0705500		AM AA	0	6	32	PCB - Aroclor 1254	0.160000E+05	UG/KG	AF298
413835	0705500		AM AA	0	6	32	PCB - Aroclor 1248	0.190000E+05	UG/KG	AF298
413836	0705454		AM AA	0	6	33	PCB - Aroclor 1254	0.790000E+04	UG/KG	AF299
413836	0705454		AM AA	0	6	33	PCB - Aroclor 1248	0.750000E+04	UG/KG	AF299
413830	0705507		AM AA	0	6	38	PCB - Aroclor 1254	0.120000E+05	UG/KG	AF300
413830	0705507		AM AA	0	6	38	PCB - Aroclor 1248	0.170000E+05	UG/KG	AF300
413833	0705459		AM AA	0	6	39	PCB - Aroclor 1254	0.330000E+04	UG/KG	AF301
413833	0705459		AM AA	0	6	39	PCB - Aroclor 1248	0.390000E+04	UG/KG	AF301
413831	0705455	1301986	AM AA	0	6	40	PCB - Aroclor 1254	0.260000E+04	UG/KG	AF302
413831	0705455	1301986	AM AA	0	6	40	PCB - Aroclor 1248	0.710000E+04	UG/KG	AF302
413831	0705455	1301986	AM AA	12	18	40	PCB - Aroclor 1254	0.870000E+04	UG/KG	AF303
413831	0705455	1301986	AM AA	12	18	40	PCB - Aroclor 1248	0.360000E+04	UG/KG	AF303
413831	0705455	1301986	AM AA	24	30	40	PCB - Aroclor 1254	0.670000E+03	UG/KG	AF304
413831	0705455	1301986	AM AA	24	30	40	PCB - Aroclor 1248		UG/KG	AF304
413832	0705447		AM AA	0	6	41	PCB - Aroclor 1254	0.144000E+05	UG/KG	AF305
413832	0705447		AM AA	0	6	41	PCB - Aroclor 1248	0.150000E+05	UG/KG	AF305
413832	0705447		AM AA	12	18	41	PCB - Aroclor 1254	0.580000E+03	UG/KG	AF306
413832	0705447		AM AA	12	18	41	PCB - Aroclor 1248		UG/LG	AF306
413832	0705447		AM AA	24	30	41	PCB - Aroclor 1254		UG/KG	AF307
413832	0705447		AM AA	24	30	41	PCB - Aroclor 1248		UG/KG	AF307
413832	0705451		AM AA	0	6	42	PCB - Aroclor 1254	0.310000E+04	UG/KG	AF308
413832	0705451		AM AA	0	6	42	PCB - Aroclor 1248	0.410000E+04	UG/KG	AF308

413832	0705438		AM AA	0	6	43	PCB - Aroclor 1254	0.720000E+04	UG/KG	AF309
413832	0705438		AM AA	0	6	43	PCB - Aroclor 1248	0.380000E+04	UG/KG	AF309
413826	0705439		AM AA	0	6	48	PCB - Aroclor 1254	0.700000E+04	UG/KG	AF310
413826	0705439		AM AA	0	6	48	PCB - Aroclor 1248	0.100000E+05	UG/KG	AF310
413827	0705435		AM AA	0	6	49	PCB - Aroclor 1254	0.130000E+04	UG/KG	AF311
413827	0705435		AM AA	0	6	49	PCB - Aroclor 1248	0.120000E+04	UG/KG	AF311
413835	0705500		AM AA	0	6	32	PCB - Aroclor 1254	0.930000E+04	UG/KG	AF312
413835	0705500		AM AA	0	6	32	PCB - Aroclor 1248	0.100000E+05	UG/KG	AF312
			AM AA	0	6	0	PCB - Aroclor 1254		UG/KG	AF313
			AM AA	0	6	0	PCB - Aroclor 1248		UG/KG	AF313
413840	0705511	2051986	AM AA	0	6	24	PCB - Aroclor 1254	0.520000E+03	UG/KG	AF314
413840	0705511	2051986	AM AA	0	6	24	PCB - Aroclor 1248	0.980000E+03	UG/KG	AF314
413836	0705509	2051986	AM AA	0	6	30	PCB - Aroclor 1254	0.100000E+04	UG/KG	AF315
413836	0705509	2051986	AM AA	0	6	30	PCB - Aroclor 1248	0.160000E+04	UG/KG	AF315
413836	0705503	2011986	AM AA	0	6	31	PCB - Aroclor 1254	0.580000E+03	UG/KG	AF393
413836	0705503	2011986	AM AA	0	6	31	PCB - Aroclor 1248	0.810000E+03	UG/KG	AF393
413836	0705445	2041986	AM AA	0	6	34	PCB - Aroclor 1254	0.560000E+03	UG/KG	AF394
413836	0705445	2041986	AM AA	0	6	34	PCB - Aroclor 1248	0.740000E+03	UG/KG	AF394
413836	0705440	2041986	AM AA	0	6	35	PCB - Aroclor 1254	0.130000E+03	UG/KG	AF395
413836	0705440	2041986	AM AA	0	6	35	PCB - Aroclor 1248	0.150000E+03	UG/KG	AF395
413835	0705437	2051986	AM AA	0	6	36	PCB - Aroclor 1254	0.710000E+03	UG/KG	AF396
413835	0705437	2051986	AM AA	0	6	36	PCB - Aroclor 1248	0.860000E+03	UG/KG	AF396
413841	0705454	2061986	AM AA	0	6	27	PCB - Aroclor 1254	0.420000E+04	UG/KG	AF397
413841	0705454	2061986	AM AA	0	6	27	PCB - Aroclor 1248	0.600000E+04	UG/KG	AF397
413826	0705519	2061986	AM AA	0	6	44	PCB - Aroclor 1254	0.220000E+04	UG/KG	AF398
413826	0705519	2061986	AM AA	0	6	44	PCB - Aroclor 1248	0.400000E+04	UG/KG	AF398
413827	0705512	2051986	AM AA	0	6	45	PCB - Aroclor 1254	0.190000E+04	UG/KG	AF399
413827	0705512	2051986	AM AA	0	6	45	PCB - Aroclor 1248	0.170000E+04	UG/KG	AF399
413827	0705512	2051986	AM AA	12	18	45	PCB - Aroclor 1254	0.330000E+04	UG/KG	AF400
413827	0705512	2051986	AM AA	12	18	45	PCB - Aroclor 1248	0.290000E+04	UG/KG	AF400
413741	0705419	12271985	AM AA	6	12	115	PCB - Aroclor 1260		UG/KG	AF538
413741	0705419	12271985	AM AA	6	12	115	PCB - Aroclor 1254	0.640000E+03	UG/KG	AF538
413741	0705419	12271985	AM AA	6	12	115	PCB - Aroclor 1221		UG/KG	AF538
413741	0705419	12271985	AM AA	6	12	115	PCB - Aroclor 1232		UG/KG	AF538
413741	0705419	12271985	AM AA	6	12	115	PCB - Aroclor 1248		UG/KG	AF538
413741	0705419	12271985	AM AA	6	12	115	PCB - Aroclor 1016		UG/KG	AF538
413741	0705419	12271985	AM AA	6	12	115	PCB - Aroclor 1242		UG/KG	AF538
413722	0705427	1031986	AM AA	6	12	142	PCB - Aroclor 1260		UG/KG	AF539
413722	0705427	1031986	AM AA	6	12	142	PCB - Aroclor 1254	0.860000E+03	UG/KG	AF539
413722	0705427	1031986	AM AA	6	12	142	PCB - Aroclor 1221		UG/KG	AF539
413722	0705427	1031986	AM AA	6	12	142	PCB - Aroclor 1232		UG/KG	AF539
413722	0705427	1031986	AM AA	6	12	142	PCB - Aroclor 1248		UG/KG	AF539
413722	0705427	1031986	AM AA	6	12	142	PCB - Aroclor 1016		UG/KG	AF539
413722	0705427	1031986	AM AA	6	12	142	PCB - Aroclor 1242	0.300000E+04	UG/KG	AF539
413722	0705427	1031986	AM AA	6	12	142	PCB - Aroclor 1260		UG/KG	AF540
413722	0705427	1031986	AM AA	6	12	142	PCB - Aroclor 1254	0.100000E+04	UG/KG	AF540

413722	0705427	1031986	AM AA	6	12	142	PCB - Aroclor 1221	0.800000E+02 UG/KG	AF540
413722	0705427	1031986	AM AA	6	12	142	PCB - Aroclor 1232	UG/KG	AF540
413722	0705427	1031986	AM AA	6	12	142	PCB - Aroclor 1248	UG/KG	AF540
413722	0705427	1031986	AM AA	6	12	142	PCB - Aroclor 1016	UG/KG	AF540
413722	0705427	1031986	AM AA	6	12	142	PCB - Aroclor 1242	0.360000E+04 UG/KG	AF540
413715	0705450	12191985	AM AA	6	12	149	PCB - Aroclor 1260	UG/KG	AF541
413715	0705450	12191985	AM AA	6	12	149	PCB - Aroclor 1254	0.520000E+03 UG/KG	AF541
413715	0705450	12191985	AM AA	6	12	149	PCB - Aroclor 1221	UG/KG	AF541
413715	0705450	12191985	AM AA	6	12	149	PCB - Aroclor 1232	UG/KG	AF541
413715	0705450	12191985	AM AA	6	12	149	PCB - Aroclor 1248	UG/KG	AF541
413715	0705450	12191985	AM AA	6	12	149	PCB - Aroclor 1016	UG/KG	AF541
413715	0705450	12191985	AM AA	6	12	149	PCB - Aroclor 1242	UG/KG	AF541
413711	0705445	12301985	AM AA	6	12	150	PCB - Aroclor 1260	UG/KG	AF542
413711	0705445	12301985	AM AA	6	12	150	PCB - Aroclor 1254	UG/KG	AF542
413711	0705445	12301985	AM AA	6	12	150	PCB - Aroclor 1221	UG/KG	AF542
413711	0705445	12301985	AM AA	6	12	150	PCB - Aroclor 1232	UG/KG	AF542
413711	0705445	12301985	AM AA	6	12	150	PCB - Aroclor 1248	UG/KG	AF542
413711	0705445	12301985	AM AA	6	12	150	PCB - Aroclor 1016	UG/KG	AF542
413711	0705445	12301985	AM AA	6	12	150	PCB - Aroclor 1242	UG/KG	AF542
413913	0705509	1091986	AM AA	6	12	1	PCB - Aroclor 1260	UG/KG	AF543
413913	0705509	1091986	AM AA	6	12	1	PCB - Aroclor 1254	0.200000E+04 UG/KG	AF543
413913	0705509	1091986	AM AA	6	12	1	PCB - Aroclor 1221	UG/KG	AF543
413913	0705509	1091986	AM AA	6	12	1	PCB - Aroclor 1232	UG/KG	AF543
413913	0705509	1091986	AM AA	6	12	1	PCB - Aroclor 1248	UG/KG	AF543
413913	0705509	1091986	AM AA	6	12	1	PCB - Aroclor 1016	UG/KG	AF543
413913	0705509	1091986	AM AA	6	12	1	PCB - Aroclor 1242	0.230000E+04 UG/KG	AF543
413812	0705513	1061986	AM AA	6	12	63	PCB - Aroclor 1260	UG/KG	AF801
413812	0705513	1061986	AM AA	6	12	63	PCB - Aroclor 1254	0.740000E+03 UG/KG	AF801
413812	0705513	1061986	AM AA	6	12	63	PCB - Aroclor 1221	UG/KG	AF801
413812	0705513	1061986	AM AA	6	12	63	PCB - Aroclor 1232	UG/KG	AF801
413812	0705513	1061986	AM AA	6	12	63	PCB - Aroclor 1248	UG/KG	AF801
413812	0705513	1061986	AM AA	6	12	63	PCB - Aroclor 1016	UG/KG	AF801
413812	0705513	1061986	AM AA	6	12	63	PCB - Aroclor 1242	UG/KG	AF801
413757	0705459	1291986	AM AA	0	6	85	PCB - Aroclor 1260	UG/KG	AF802
413757	0705459	1291986	AM AA	0	6	85	PCB - Aroclor 1254	0.320000E+04 UG/KG	AF802
413757	0705459	1291986	AM AA	0	6	85	PCB - Aroclor 1221	UG/KG	AF802
413757	0705459	1291986	AM AA	0	6	85	PCB - Aroclor 1232	UG/KG	AF802
413757	0705459	1291986	AM AA	0	6	85	PCB - Aroclor 1248	UG/KG	AF802
413757	0705459	1291986	AM AA	0	6	85	PCB - Aroclor 1016	UG/KG	AF802
413757	0705459	1291986	AM AA	0	6	85	PCB - Aroclor 1242	UG/KG	AF802
413905	0705512	1211986	AM AA	6	12	4	PCB - Aroclor 1260	UG/KG	AF803
413905	0705512	1211986	AM AA	6	12	4	PCB - Aroclor 1254	0.760000E+04 UG/KG	AF803
413905	0705512	1211986	AM AA	6	12	4	PCB - Aroclor 1221	UG/KG	AF803
413905	0705512	1211986	AM AA	6	12	4	PCB - Aroclor 1232	UG/KG	AF803
413905	0705512	1211986	AM AA	6	12	4	PCB - Aroclor 1248	UG/KG	AF803
413905	0705512	1211986	AM AA	6	12	4	PCB - Aroclor 1016	UG/KG	AF803

413905	0705512	1211986	AM	AA	6	12	4	PCB - Aroclor 1242	0.230000E+05	UG/KG	AF803
413851	0705519	1311986	AM	AA	6	12	12	PCB - Aroclor 1260		UG/KG	AF804
413851	0705519	1311986	AM	AA	6	12	12	PCB - Aroclor 1254	0.170000E+05	UG/KG	AF804
413851	0705519	1311986	AM	AA	6	12	12	PCB - Aroclor 1221		UG/KG	AF804
413851	0705519	1311986	AM	AA	6	12	12	PCB - Aroclor 1232		UG/KG	AF804
413851	0705519	1311986	AM	AA	6	12	12	PCB _ Aroclor 1248		UG/KG	AF804
413851	0705519	1311986	AM	AA	6	12	12	PCB - Aroclor 1016		UG/KG	AF804
413851	0705519	1311986	AM	AA	6	12	12	PCB - Aroclor 1242		UG/KG	AF804
413846	0705513		AM	AA	6	12	19	PCB - Aroclor 1260		UG/KG	AF805
413846	0705513		AM	AA	6	12	19	PCB - Aroclor 1254	0.160000E+04	UG/KG	AF805
413846	0705513		AM	AA	6	12	19	PCB - Aroclor 1221		UG/KG	AF805
413846	0705513		AM	AA	6	12	19	PCB - Aroclor 1232		UG/KG	AF805
413846	0705513		AM	AA	6	12	19	PCB _ Aroclor 1248		UG/KG	AF805
413846	0705513		AM	AA	6	12	19	PCB - Aroclor 1016		UG/KG	AF805
413846	0705513		AM	AA	6	12	19	PCB - Aroclor 1242	0.380000E+04	UG/KG	AF805
413812	0705506	1061986	AM	AA	6	12	64	PCB - Aroclor 1260		UG/KG	AF806
413812	0705506	1061986	AM	AA	6	12	64	PCB - Aroclor 1254	0.140000E+05	UG/KG	AF806
413812	0705506	1061986	AM	AA	6	12	64	PCB - Aroclor 1221		UG/KG	AF806
413812	0705506	1061986	AM	AA	6	12	64	PCB - Aroclor 1232		UG/KG	AF806
413812	0705506	1061986	AM	AA	6	12	64	PCB _ Aroclor 1248		UG/KG	AF806
413812	0705506	1061986	AM	AA	6	12	64	PCB - Aroclor 1016		UG/KG	AF806
413812	0705506	1061986	AM	AA	6	12	64	PCB - Aroclor 1242	0.450000E+05	UG/KG	AF806
413702	0705439	1091986	AM	AA	6	12	159	PCB - Aroclor 1260		UG/KG	AF807
413702	0705439	1091986	AM	AA	6	12	159	PCB - Aroclor 1254	0.100000E+04	UG/KG	AF807
413702	0705439	1091986	AM	AA	6	12	159	PCB - Aroclor 1221		UG/KG	AF807
413702	0705439	1091986	AM	AA	6	12	159	PCB - Aroclor 1232		UG/KG	AF807
413702	0705439	1091986	AM	AA	6	12	159	PCB _ Aroclor 1248		UG/KG	AF807
413702	0705439	1091986	AM	AA	6	12	159	PCB - Aroclor 1016		UG/KG	AF807
413702	0705439	1091986	AM	AA	6	12	159	PCB - Aroclor 1242		UG/KG	AF807
413652	0705430	1091986	AM	AA	6	12	165	PCB - Aroclor 1260		UG/KG	AF808
413652	0705430	1091986	AM	AA	6	12	165	PCB - Aroclor 1254	0.290000E+04	UG/KG	AF808
413652	0705430	1091986	AM	AA	6	12	165	PCB - Aroclor 1221		UG/KG	AF808
413652	0705430	1091986	AM	AA	6	12	165	PCB - Aroclor 1232		UG/KG	AF808
413652	0705430	1091986	AM	AA	6	12	165	PCB _ Aroclor 1248		UG/KG	AF808
413652	0705430	1091986	AM	AA	6	12	165	PCB - Aroclor 1016		UG/KG	AF808
413652	0705430	1091986	AM	AA	6	12	165	PCB - Aroclor 1242		UG/KG	AF808
413901	0705505	1211986	AM	AA	6	12	8	PCB - Aroclor 1260		UG/KG	AF809
413901	0705505	1211986	AM	AA	6	12	8	PCB - Aroclor 1254	0.230000E+04	UG/KG	AF809
413901	0705505	1211986	AM	AA	6	12	8	PCB - Aroclor 1221		UG/KG	AF809
413901	0705505	1211986	AM	AA	6	12	8	PCB - Aroclor 1232		UG/KG	AF809
413901	0705505	1211986	AM	AA	6	12	8	PCB _ Aroclor 1248		UG/KG	AF809
413901	0705505	1211986	AM	AA	6	12	8	PCB - Aroclor 1016		UG/KG	AF809
413901	0705505	1211986	AM	AA	6	12	8	PCB - Aroclor 1242		UG/KG	AF809
413840	0705501		AM	AA	6	12	26	PCB - Aroclor 1260		UG/KG	AF810
413840	0705501		AM	AA	6	12	26	PCB - Aroclor 1254	0.590000E+03	UG/KG	AF810
413840	0705501		AM	AA	6	12	26	PCB - Aroclor 1221		UG/KG	AF810

413840	0705501		AM AA	6 12 26	PCB - Aroclor 1232		UG/KG	AF810
413840	0705501		AM AA	6 12 26	PCB - Aroclor 1248		UG/KG	AF810
413840	0705501		AM AA	6 12 26	PCB - Aroclor 1016		UG/KG	AF810
413840	0705501		AM AA	6 12 26	PCB - Aroclor 1242		UG/KG	AF810
413831	0705455	1301986	AM AA	6 12 40	PCB - Aroclor 1260		UG/KG	AF811
413831	0705455	1301986	AM AA	6 12 40	PCB - Aroclor 1254	0.880000E+04	UG/KG	AF811
413831	0705455	1301986	AM AA	6 12 40	PCB - Aroclor 1221		UG/KG	AF811
413831	0705455	1301986	AM AA	6 12 40	PCB - Aroclor 1232		UG/KG	AF811
413831	0705455	1301986	AM AA	6 12 40	PCB - Aroclor 1248		UG/KG	AF811
413831	0705455	1301986	AM AA	6 12 40	PCB - Aroclor 1016		UG/KG	AF811
413831	0705455	1301986	AM AA	6 12 40	PCB - Aroclor 1242	0.790000E+04	UG/KG	AF811
413812	0705453	1061986	AM AA	6 12 66	PCB - Aroclor 1260		UG/KG	AF812
413812	0705453	1061986	AM AA	6 12 66	PCB - Aroclor 1254	0.510000E+04	UG/KG	AF812
413812	0705453	1061986	AM AA	6 12 66	PCB - Aroclor 1221		UG/KG	AF812
413812	0705453	1061986	AM AA	6 12 66	PCB - Aroclor 1232		UG/KG	AF812
413812	0705453	1061986	AM AA	6 12 66	PCB - Aroclor 1248		UG/KG	AF812
413812	0705453	1061986	AM AA	6 12 66	PCB - Aroclor 1016		UG/KG	AF812
413812	0705453	1061986	AM AA	6 12 66	PCB - Aroclor 1242		UG/KG	AF812
413801	0705433	1071986	AM AA	6 12 83	PCB - Aroclor 1260		UG/KG	AF813
413801	0705433	1071986	AM AA	6 12 83	PCB - Aroclor 1254	0.240000E+04	UG/KG	AF813
413801	0705433	1071986	AM AA	6 12 83	PCB - Aroclor 1221		UG/KG	AF813
413801	0705433	1071986	AM AA	6 12 83	PCB - Aroclor 1232		UG/KG	AF813
413801	0705433	1071986	AM AA	6 12 83	PCB - Aroclor 1248		UG/KG	AF813
413801	0705433	1071986	AM AA	6 12 83	PCB - Aroclor 1016		UG/KG	AF813
413801	0705433	1071986	AM AA	6 12 83	PCB - Aroclor 1242		UG/KG	AF813
413623	0705404	1161986	AM AA	6 12 178	PCB - Aroclor 1260	0.160000E+03	UG/KG	AF814
413623	0705404	1161986	AM AA	6 12 178	PCB - Aroclor 1254	0.590000E+03	UG/KG	AF814
413623	0705404	1161986	AM AA	6 12 178	PCB - Aroclor 1221		UG/KG	AF814
413623	0705404	1161986	AM AA	6 12 178	PCB - Aroclor 1232		UG/KG	AF814
413623	0705404	1161986	AM AA	6 12 178	PCB - Aroclor 1248		UG/KG	AF814
413623	0705404	1161986	AM AA	6 12 178	PCB - Aroclor 1016		UG/KG	AF814
413623	0705404	1161986	AM AA	6 12 178	PCB - Aroclor 1242		UG/KG	AF814
413827	0705512	2051986	AM AA	6 12 45	PCB - Aroclor 1260		UG/KG	AF815
413827	0705512	2051986	AM AA	6 12 45	PCB - Aroclor 1254	0.700000E+04	UG/KG	AF815
413827	0705512	2051986	AM AA	6 12 45	PCB - Aroclor 1221		UG/KG	AF815
413827	0705512	2051986	AM AA	6 12 45	PCB - Aroclor 1232		UG/KG	AF815
413827	0705512	2051986	AM AA	6 12 45	PCB - Aroclor 1248		UG/KG	AF815
413827	0705512	2051986	AM AA	6 12 45	PCB - Aroclor 1016		UG/KG	AF815
413827	0705512	2051986	AM AA	6 12 45	PCB - Aroclor 1242		UG/KG	AF815
413821	0705439	1041986	AM AA	6 12 53	PCB - Aroclor 1260		UG/KG	AF816
413821	0705439	1041986	AM AA	6 12 53	PCB - Aroclor 1254	0.180000E+04	UG/KG	AF816
413821	0705439	1041986	AM AA	6 12 53	PCB - Aroclor 1221		UG/KG	AF816
413821	0705439	1041986	AM AA	6 12 53	PCB - Aroclor 1232		UG/KG	AF816
413821	0705439	1041986	AM AA	6 12 53	PCB - Aroclor 1248		UG/KG	AF816
413821	0705439	1041986	AM AA	6 12 53	PCB - Aroclor 1016		UG/KG	AF816
413821	0705439	1041986	AM AA	6 12 53	PCB - Aroclor 1242		UG/KG	AF816

413747	0705439	1181986	AM	AA	6	12	105	PCB - Aroclor 1260		UG/KG	AF817
413747	0705439	1181986	AM	AA	6	12	105	PCB - Aroclor 1254		UG/KG	AF817
413747	0705439	1181986	AM	AA	6	12	105	PCB - Aroclor 1221		UG/KG	AF817
413747	0705439	1181986	AM	AA	6	12	105	PCB - Aroclor 1232		UG/KG	AF817
413747	0705439	1181986	AM	AA	6	12	105	PCB - Aroclor 1248		UG/KG	AF817
413747	0705439	1181986	AM	AA	6	12	105	PCB - Aroclor 1016		UG/KG	AF817
413747	0705439	1181986	AM	AA	6	12	105	PCB - Aroclor 1242		UG/KG	AF817
413648	0705417	1181986	AM	AA	6	12	168	PCB - Aroclor 1260		UG/KG	AF818
413648	0705417	1181986	AM	AA	6	12	168	PCB - Aroclor 1254		UG/KG	AF818
413648	0705417	1181986	AM	AA	6	12	168	PCB - Aroclor 1221		UG/KG	AF818
413648	0705417	1181986	AM	AA	6	12	168	PCB - Aroclor 1232		UG/KG	AF818
413648	0705417	1181986	AM	AA	6	12	168	PCB - Aroclor 1248		UG/KG	AF818
413648	0705417	1181986	AM	AA	6	12	168	PCB - Aroclor 1016		UG/KG	AF818
413648	0705417	1181986	AM	AA	6	12	168	PCB - Aroclor 1242		UG/KG	AF818
			AM	AA	NA	NA	0	PCB - Aroclor 1260		UG/KG	AF819
			AM	AA	NA	NA	0	PCB - Aroclor 1254		UG/KG	AF819
			AM	AA	NA	NA	0	PCB - Aroclor 1221		UG/KG	AF819
			AM	AA	NA	NA	0	PCB - Aroclor 1232		UG/KG	AF819
			AM	AA	NA	NA	0	PCB - Aroclor 1248		UG/KG	AF819
			AM	AA	NA	NA	0	PCB - Aroclor 1016		UG/KG	AF819
			AM	AA	NA	NA	0	PCB - Aroclor 1242		UG/KG	AF819
413856	0705513	1231986	AM	AA	12	18	9	Lead	0.520000E+02	MG/KG	MAB343
413857	0705459	19860123	AM	AA	12	18	9	Chromium	0.250000E+02	MG/KG	MAB343
413856	0705513	1231986	AM	AA	12	18	9	Copper	0.900000E+02	MG/KG	MAB343
413857	0705459	19860123	AM	AA	24	30	9	Lead	0.310000E+02	MG/KG	MAB344
413857	0705459	19860123	AM	AA	24	30	9	Chromium	0.270000E+02	MG/KG	MAB344
413856	0705513	1231986	AM	AA	24	30	9	Copper	0.580000E+02	MG/KG	MAB344
413857	0705450	19860121	AM	AA	0	6	10	Lead	0.590000E+02	MG/KG	MAB345
413856	0705507	1211986	AM	AA	0	6	10	Chromium	0.500000E+02	MG/KG	MAB345
413857	0705450	19860121	AM	AA	0	6	10	Copper	0.137000E+03	MG/KG	MAB345
413856	0705507	1211986	AM	AA	12	18	10	Lead	0.210000E+01	MG/KG	MAB346
413857	0705450	19860121	AM	AA	12	18	10	Chromium	0.130000E+02	MG/KG	MAB346
413856	0705507	1211986	AM	AA	24	30	10	Lead	0.270000E+01	MG/KG	MAB347
413856	0705507	1211986	AM	AA	24	30	10	Chromium	0.100000E+02	MG/KG	MAB347
413849	0705507	19860122	AM	AA	0	6	12	Lead	0.559000E+03	MG/KG	MAB348
413851	0705520	1221986	AM	AA	0	6	12	Cadmium	0.140000E+02	MG/KG	MAB348
413851	0705520	1221986	AM	AA	0	6	12	Chromium	0.115000E+04	MG/KG	MAB348
413851	0705520	1221986	AM	AA	0	6	12	Copper	0.279000E+04	MG/KG	MAB348
413849	0705507	19860122	AM	AA	12	18	12	Lead	0.345000E+03	MG/KG	MAB349
413851	0705520	1221986	AM	AA	12	18	12	Lead	0.345000E+03	MG/KG	MAB349
413849	0705507	19860122	AM	AA	12	18	12	Chromium	0.514000E+03	MG/KG	MAB349
413851	0705520	1221986	AM	AA	12	18	12	Chromium	0.514000E+03	MG/KG	MAB349
413851	0705520	1221986	AM	AA	12	18	12	Copper	0.155000E+04	MG/KG	MAB349
413849	0705507	19860122	AM	AA	12	18	12	Copper	0.155000E+04	MG/KG	MAB349
413817	0705435	19860121	AM	AA	0	6	6	Lead	0.323000E+03	MG/KG	MAB390

413817	0705435	19860121	AM	AA	0	6	6	Chromium	0.252000E+03	MG/KG	MAB390
413817	0705435	19860121	AM	AA	0	6	6	Copper	0.463000E+03	MG/KG	MAB390
413856	0705459	19860122	AM	AA	0	6	11	Lead	0.900000E+01	MG/KG	MAB391
413856	0705459	19860122	AM	AA	0	6	11	Chromium	0.310000E+02	MG/KG	MAB391
413856	0705459	19860122	AM	AA	0	6	11	Copper	0.113000E+03	MG/KG	MAB391
413851	0705448	19860123	AM	AA	0	6	17	Lead	0.510000E+02	MG/KG	MAB392
413851	0705448	19860123	AM	AA	0	6	17	Chromium	0.470000E+02	MG/KG	MAB392
413851	0705448	19860123	AM	AA	0	6	17	Copper	0.224000E+03	MG/KG	MAB392
413846	0705519	19860123	AM	AA	0	6	18	Lead	0.416000E+03	MG/KG	MAB393
413846	0705519	19860123	AM	AA	0	6	18	Cadmium	0.900000E+01	MG/KG	MAB393
413846	0705519	19860123	AM	AA	0	6	18	Chromium	0.828000E+03	MG/KG	MAB393
413846	0705519	19860123	AM	AA	0	6	18	Copper	0.195000E+04	MG/KG	MAB393
413846	0705513	19860123	AM	AA	0	6	19	Lead	0.353000E+03	MG/KG	MAB394
413846	0705513	19860123	AM	AA	0	6	19	Cadmium	0.170000E+02	MG/KG	MAB394
413846	0705513	19860123	AM	AA	0	6	19	Chromium	0.122000E+04	MG/KG	MAB394
413846	0705513	19860123	AM	AA	0	6	19	Copper	0.219010E+05	MG/KG	MAB394
413844	0705501	19860125	AM	AA	0	6	21	Lead	0.320000E+03	MG/KG	MAB395
413844	0705501	19860125	AM	AA	0	6	21	Chromium	0.558000E+03	MG/KG	MAB395
413844	0705501	19860125	AM	AA	0	6	21	Copper	0.146000E+04	MG/KG	MAB395
413846	0705454	19860123	AM	AA	0	6	22	Lead	0.463000E+03	MG/KG	MAB396
413846	0705454	19860123	AM	AA	0	6	22	Cadmium	0.100000E+02	MG/KG	MAB396
413846	0705454	19860123	AM	AA	0	6	22	Chromium	0.107000E+04	MG/KG	MAB396
413846	0705454	19860123	AM	AA	0	6	22	Copper	0.214000E+04	MG/KG	MAB396
413840	0705511	19860205	AM	AA	0	6	24	Lead	0.230000E+03	MG/KG	MAB397
413840	0705511	19860205	AM	AA	0	6	24	Cadmium	0.900000E+01	MG/KG	MAB397
413840	0705511	19860205	AM	AA	0	6	24	Chromium	0.445000E+03	MG/KG	MAB397
413840	0705511	19860205	AM	AA	0	6	24	Copper	0.792000E+03	MG/KG	MAB397
413841	0705454	19860124	AM	AA	0	6	27	Lead	0.218000E+03	MG/KG	MAB398
413841	0705454	19860124	AM	AA	0	6	27	Chromium	0.424000E+03	MG/KG	MAB398
413841	0705454	19860124	AM	AA	0	6	27	Copper	0.884000E+03	MG/KG	MAB398
413842	0705449	19860124	AM	AA	0	6	28	Lead	0.286000E+03	MG/KG	MAB399
413842	0705449	19860124	AM	AA	0	6	28	Chromium	0.658000E+03	MG/KG	MAB399
413842	0705449	19860124	AM	AA	0	6	28	Copper	0.119000E+04	MG/KG	MAB399
413831	0705519	19860206	AM	AA	0	6	37	Lead	0.120000E+03	MG/KG	MAB400
413831	0705519	19860206	AM	AA	0	6	37	Cadmium	0.400000E+01	MG/KG	MAB400
413831	0705519	19860206	AM	AA	0	6	37	Chromium	0.264000E+03	MG/KG	MAB400
413831	0705519	19860206	AM	AA	0	6	37	Copper	0.541000E+03	MG/KG	MAB400
		1161986	AM	AO	NA	NA		Lead	0.420000E+01	MG/KG	MAC601
		1161986	AM	AO	NA	NA		Chromium	0.200000E+01	MG/KG	MAC601
		1161986	AM	AO	NA	NA		Copper	0.200000E+01	MG/KG	MAC601
413913	0705504	1211986	AM	AA	0	6	2	Lead	0.943000E+02	MG/KG	MAC602
413913	0705504	1211986	AM	AA	0	6	2	Chromium	0.113000E+03	MG/KG	MAC602
413913	0705504	1211986	AM	AA	0	6	2	Copper	0.213000E+03	MG/KG	MAC602
413913	0705504	1211986	AM	AA	12	18	2	Lead	0.620000E+01	MG/KG	MAC603
413913	0705504	1211986	AM	AA	12	18	2	Chromium	0.150000E+02	MG/KG	MAC603
413913	0705504	1211986	AM	AA	12	18	2	Copper	0.700000E+01	MG/KG	MAC603

413913	0705504	1211986	AM	AA	24	30	2	Lead	0.136000E+02	MG/KG	MAC604
413913	0705504	1211986	AM	AA	24	30	2	Chromium	0.370000E+02	MG/KG	MAC604
413913	0705504	1211986	AM	AA	24	30	2	Copper	0.500000E+02	MG/KG	MAC604
413910	0705509	1211986	AM	AA	0	6	3	Lead	0.280000E+03	MG/KG	MAC605
413910	0705509	1211986	AM	AA	0	6	3	Cadmium	0.108000E+02	MG/KG	MAC605
413910	0705509	1211986	AM	AA	0	6	3	Chromium	0.443000E+03	MG/KG	MAC605
413910	0705509	1211986	AM	AA	0	6	3	Copper	0.127700E+04	MG/KG	MAC605
413905	0705512	1211986	AM	AA	0	6	4	Lead	0.164000E+03	MG/KG	MAC606
413905	0705512	1211986	AM	AA	0	6	4	Cadmium	0.980000E+01	MG/KG	MAC606
413905	0705512	1211986	AM	AA	0	6	4	Chromium	0.428000E+03	MG/KG	MAC606
413905	0705512	1211986	AM	AA	0	6	4	Copper	0.930000E+03	MG/KG	MAC606
413901	0705513	1211986	AM	AA	0	6	7	Lead	0.341000E+02	MG/KG	MAC607
413901	0705513	1211986	AM	AA	0	6	7	Chromium	0.380000E+02	MG/KG	MAC607
413901	0705513	1211986	AM	AA	0	6	7	Copper	0.132000E+03	MG/KG	MAC607
413901	0705513	1211986	AM	AA	12	18	7	Lead	0.306000E+02	MG/KG	MAC608
413901	0705513	1211986	AM	AA	12	18	7	Chromium	0.620000E+02	MG/KG	MAC608
413901	0705513	1211986	AM	AA	12	18	7	Copper	0.153000E+03	MG/KG	MAC608
413901	0705513	1211986	AM	AA	24	30	7	Lead	0.299000E+02	MG/KG	MAC609
413901	0705513	1211986	AM	AA	24	30	7	Chromium	0.750000E+02	MG/KG	MAC609
413901	0705513	1211986	AM	AA	24	30	7	Copper	0.182000E+03	MG/KG	MAC609
413901	0705513	1211986	AM	AA	36	42	7	Lead	0.465000E+02	MG/KG	MAC610
413901	0705513	1211986	AM	AA	36	42	7	Cadmium	0.390000E+01	MG/KG	MAC610
413901	0705513	1211986	AM	AA	36	42	7	Chromium	0.950000E+02	MG/KG	MAC610
413901	0705513	1211986	AM	AA	36	42	7	Copper	0.246000E+03	MG/KG	MAC610
413856	0705513	1231986	AM	AA	0	6	9	Lead	0.224000E+03	MG/KG	MAC611
413856	0705513	1231986	AM	AA	0	6	9	Cadmium	0.690000E+01	MG/KG	MAC611
413856	0705513	1231986	AM	AA	0	6	9	Chromium	0.469000E+03	MG/KG	MAC611
413856	0705513	1231986	AM	AA	0	6	9	Copper	0.102500E+04	MG/KG	MAC611
413851	0705506	1231986	AM	AA	0	6	14	Lead	0.433000E+02	MG/KG	MAC612
413851	0705506	1231986	AM	AA	0	6	14	Chromium	0.590000E+02	MG/KG	MAC612
413851	0705506	1231986	AM	AA	0	6	14	Copper	0.174000E+03	MG/KG	MAC612
413851	0705506	1231986	AM	AA	12	18	14	Lead	0.550000E+01	MG/KG	MAC613
413851	0705506	1231986	AM	AA	12	18	14	Chromium	0.800000E+01	MG/KG	MAC613
413851	0705506	1231986	AM	AA	12	18	14	Copper	0.700000E+01	MG/KG	MAC613
413851	0705506	1311986	AM	AA	24	30	14	Lead	0.310000E+01	MG/KG	MAC614
413851	0705506	1311986	AM	AA	24	30	14	Chromium	0.600000E+01	MG/KG	MAC614
413851	0705506	1311986	AM	AA	24	30	14	Copper	0.300000E+01	MG/KG	MAC614
413757	0705432	1311986	AM	AA	0	6	89	Lead	0.310000E+01	MG/KG	MAC615
413757	0705432	1311986	AM	AA	0	6	89	Chromium	0.150000E+02	MG/KG	MAC615
413757	0705432	1311986	AM	AA	0	6	89	Copper	0.500000E+02	MG/KG	MAC615
413757	0705432	1311986	AM	AA	12	18	89	Lead	0.620000E+01	MG/KG	MAC616
413757	0705432	1311986	AM	AA	12	18	89	Chromium	0.130000E+02	MG/KG	MAC616
413757	0705432	1311986	AM	AA	12	18	89	Copper	0.300000E+01	MG/KG	MAC616
413757	0705432	1311986	AM	AA	24	30	89	Lead	0.580000E+01	MG/KG	MAC617
413757	0705432	1311986	AM	AA	24	30	89	Chromium	0.160000E+02	MG/KG	MAC617
413757	0705432	1311986	AM	AA	24	30	89	Copper	0.400000E+01	MG/KG	MAC617

413757	0705432	1311986	AM	AA	36	42	89	Lead	0.400000E+01	MG/KG	MAC618
413757	0705432	1311986	AM	AA	36	42	89	Chromium	0.700000E+01	MG/KG	MAC618
413648	0705417	1201986	AM	AA	0	6	168	Lead	0.236000E+02	MG/KG	MAC619
413648	0705417	1201986	AM	AA	0	6	168	Chromium	0.410000E+02	MG/KG	MAC619
413648	0705417	1201986	AM	AA	0	6	168	Copper	0.630000E+02	MG/KG	MAC619
413648	0705417	1201986	AM	AA	12	18	168	Lead	0.400000E+01	MG/KG	MAC620
413648	0705417	1201986	AM	AA	12	18	168	Chromium	0.170000E+01	MG/KG	MAC620
413648	0705417	1201986	AM	AA	12	18	168	Copper	0.400000E+01	MG/KG	MAC620
413648	0705417	1201986	AM	AA	24	30	168	Lead	0.410000E+01	MG/KG	MAC621
413648	0705417	1201986	AM	AA	24	30	168	Chromium	0.120000E+02	MG/KG	MAC621
413648	0705417	1201986	AM	AA	24	30	168	Copper	0.300000E+01	MG/KG	MAC621
413623	0705404	1161986	AM	AA	0	6	178	Lead	0.308000E+02	MG/KG	MAC622
413623	0705404	1161986	AM	AA	0	6	178	Chromium	0.380000E+02	MG/KG	MAC622
413623	0705404	1161986	AM	AA	0	6	178	Copper	0.510000E+02	MG/KG	MAC622
413633	0705411	1161986	AM	AA	12	18	178	Lead	0.199000E+02	MG/KG	MAC623
413633	0705411	1161986	AM	AA	12	18	178	Chromium	0.120000E+02	MG/KG	MAC623
413633	0705411	1161986	AM	AA	12	18	178	Copper	0.130000E+02	MG/KG	MAC623
413623	0705404	1161986	AM	AA	24	30	178	Lead	0.450000E+01	MG/KG	MAC624
413623	0705404	1161986	AM	AA	24	30	178	Chromium	0.110000E+02	MG/KG	MAC624
413623	0705404	1161986	AM	AA	24	30	178	Copper	0.120000E+02	MG/KG	MAC624
413851	0705506	1231986	AM	AA	24	30	14	Lead	0.360000E+01	MG/KG	MAC625
413851	0705506	1231986	AM	AA	24	30	14	Chromium	0.600000E+01	MG/KG	MAC625
413851	0705506	1231986	AM	AA	24	30	14	Copper	0.300000E+01	MG/KG	MAC625
413826	0705519	19860206	AM	AA	0	6	44	Lead	0.345000E+03	MG/KG	MAC626
413826	0705519	19860206	AM	AA	0	6	44	Cadmium	0.110000E+02	MG/KG	MAC626
413826	0705519	19860206	AM	AA	0	6	44	Chromium	0.567000E+03	MG/KG	MAC626
413826	0705519	19860206	AM	AA	0	6	44	Copper	0.101000E+04	MG/KG	MAC626
413826	0705439	19860206	AM	AA	0	6	48	Lead	0.115000E+03	MG/KG	MAC627
413826	0705439	19860206	AM	AA	0	6	48	Cadmium	0.400000E+01	MG/KG	MAC627
413826	0705439	19860206	AM	AA	0	6	48	Chromium	0.306000E+03	MG/KG	MAC627
413826	0705439	19860206	AM	AA	0	6	48	Copper	0.496000E+03	MG/KG	MAC627
413820	0705508	19860131	AM	AA	0	6	50	Lead	0.141000E+03	MG/KG	MAC628
413820	0705508	19860131	AM	AA	0	6	50	Chromium	0.290000E+03	MG/KG	MAC628
413820	0705508	19860131	AM	AA	0	6	50	Copper	0.541000E+03	MG/KG	MAC628
413821	0705433	19860104	AM	AA	0	6	54	Lead	0.231000E+03	MG/KG	MAC629
413821	0705433	19860104	AM	AA	0	6	54	Chromium	0.195000E+03	MG/KG	MAC629
413821	0705433	19860104	AM	AA	0	6	54	Copper	0.493000E+03	MG/KG	MAC629
413817	0705506	19860106	AM	AA	0	6	56	Lead	0.179000E+03	MG/KG	MAC630
413817	0705506	19860106	AM	AA	0	6	56	Chromium	0.271000E+03	MG/KG	MAC630
413817	0705506	19860106	AM	AA	0	6	56	Copper	0.497000E+03	MG/KG	MAC630
413812	0705500	19860106	AM	AA	0	6	65	Lead	0.147000E+03	MG/KG	MAC631
413812	0705500	19860106	AM	AA	0	6	65	Cadmium	0.500000E+01	MG/KG	MAC631
413812	0705500	19860106	AM	AA	0	6	65	Chromium	0.322000E+03	MG/KG	MAC631
413812	0705500	19860106	AM	AA	0	6	65	Copper	0.608000E+03	MG/KG	MAC631
413808	0705511	19860107	AM	AA	0	6	71	Lead	0.167000E+03	MG/KG	MAC632
413808	0705511	19860107	AM	AA	0	6	71	Cadmium	0.400000E+01	MG/KG	MAC632

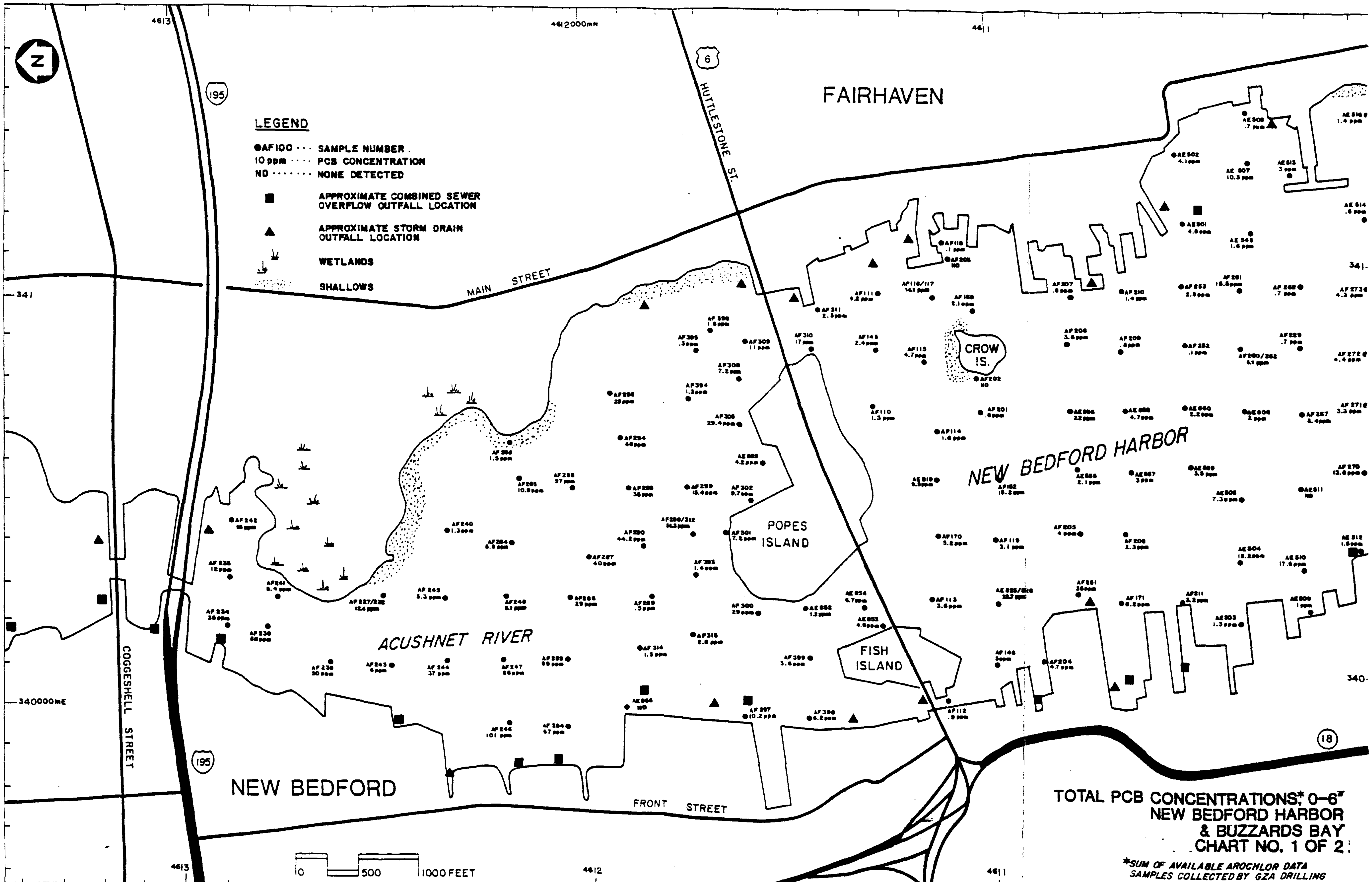
413808	0705511	19860107	AM	AA	0	6	71	Chromium	0.181000E+03	MG/KG	MAC632
413808	0705511	19860107	AM	AA	0	6	71	Copper	0.379000E+03	MG/KG	MAC632
413756	0705505	19860109	AM	AA	0	6	84	Lead	0.103000E+03	MG/KG	MAC633
413756	0705505	19860109	AM	AA	0	6	84	Chromium	0.100000E+03	MG/KG	MAC633
413756	0705505	19860109	AM	AA	0	6	84	Copper	0.187000E+03	MG/KG	MAC633
413752	0705414	19851228	AM	AA	6	12	100	Lead	0.245000E+03	MG/KG	MAC634
413752	0705414	19851228	AM	AA	6	12	100	Chromium	0.330000E+02	MG/KG	MAC634
413752	0705414	19851228	AM	AA	6	12	100	Copper	0.400000E+02	MG/KG	MAC634
413742	0705501	19860117	AM	AA	0	6	109	Lead	0.104000E+03	MG/KG	MAC635
413742	0705501	19860117	AM	AA	0	6	109	Chromium	0.910000E+02	MG/KG	MAC635
413742	0705501	19860117	AM	AA	0	6	109	Copper	0.204000E+03	MG/KG	MAC635
413736	0705426	19851228	AM	AA	6	12	121	Lead	0.420000E+02	MG/KG	MAC636
413736	0705426	19851228	AM	AA	6	12	121	Chromium	0.330000E+02	MG/KG	MAC636
413736	0705426	19851228	AM	AA	6	12	121	Copper	0.970000E+02	MG/KG	MAC636
413727	0705427	19851220	AM	AA	6	12	135	Lead	0.270000E+02	MG/KG	MAC637
413727	0705427	19851220	AM	AA	6	12	135	Chromium	0.100000E+02	MG/KG	MAC637
413727	0705427	19851220	AM	AA	6	12	135	Copper	0.200000E+02	MG/KG	MAC637
413702	0705439	19851220	AM	AA	6	12	159	Lead	0.660000E+02	MG/KG	MAC638
413702	0705439	19851220	AM	AA	6	12	159	Chromium	0.910000E+02	MG/KG	MAC638
413702	0705439	19851220	AM	AA	6	12	159	Copper	0.195000E+03	MG/KG	MAC638
413638	0705418	19860113	AM	AA	0	6	171	Lead	0.106000E+03	MG/KG	MAC639
413638	0705418	19860113	AM	AA	0	6	171	Chromium	0.500000E+02	MG/KG	MAC639
413638	0705418	19860113	AM	AA	0	6	171	Copper	0.154000E+03	MG/KG	MAC639
413613	0705403	19860116	AM	AA	0	6	181	Lead	0.110000E+02	MG/KG	MAC640
413613	0705403	19860116	AM	AA	0	6	181	Chromium	0.900000E+01	MG/KG	MAC640
413817	0705435	19860121	AM	AA	0	6	6	Lead	0.870000E+02	MG/KG	MAC641
413817	0705435	19860121	AM	AA	0	6	6	Chromium	0.259000E+03	MG/KG	MAC641
413817	0705435	19860121	AM	AA	0	6	6	Copper	0.480000E+03	MG/KG	MAC641
		19860204	AM	AA	0	6	1Q	Lead	0.400000E+01	MG/KG	MAC642
413821	0705439	1041986	AM	AA	0	6	53	Lead	0.100000E+03	MG/KG	MAC645
413821	0705439	1041986	AM	AA	0	6	53	Chromium	0.960000E+02	MG/KG	MAC645
413821	0705439	1041986	AM	AA	0	6	53	Copper	0.422000E+03	MG/KG	MAC645
413821	0705439	1041986	AM	AA	12	18	53	Lead	0.370000E+02	MG/KG	MAC646
413821	0705439	1041986	AM	AA	12	18	53	Chromium	0.420000E+02	MG/KG	MAC646
413821	0705439	1041986	AM	AA	12	18	53	Copper	0.145000E+03	MG/KG	MAC646
413821	0705439	1041986	AM	AA	24	30	53	Lead	0.810000E+01	MG/KG	MAC647
413821	0705439	1041986	AM	AA	24	30	53	Chromium	0.210000E+02	MG/KG	MAC647
413821	0705439	1041986	AM	AA	24	30	53	Copper	0.320000E+02	MG/KG	MAC647
413812	0705513	1061986	AM	AA	0	6	63	Lead	0.840000E+02	MG/KG	MAC648
413812	0705513	1061986	AM	AA	0	6	63	Chromium	0.103000E+03	MG/KG	MAC648
413812	0705513	1061986	AM	AA	0	6	63	Copper	0.271000E+03	MG/KG	MAC648
413812	0705513	1061986	AM	AA	12	18	63	Lead	0.102000E+03	MG/KG	MAC649
413812	0705513	1061986	AM	AA	12	18	63	Chromium	0.360000E+02	MG/KG	MAC649
413812	0705513	1061986	AM	AA	12	18	63	Copper	0.167000E+03	MG/KG	MAC649
413812	0705513	1061986	AM	AA	24	30	63	Lead	0.510000E+02	MG/KG	MAC650
413812	0705513	1061986	AM	AA	24	30	63	Chromium	0.410000E+02	MG/KG	MAC650

413812	0705513	1061986	AM	AA	24	30	63	Copper	0.141000E+03	MG/KG	MAC650
413812	0705513	1061986	AM	AA	36	42	63	Lead	0.660000E+02	MG/KG	MAC651
413812	0705513	1061986	AM	AA	36	42	63	Chromium	0.200000E+02	MG/KG	MAC651
413812	0705513	1061986	AM	AA	36	42	63	Copper	0.950000E+02	MG/KG	MAC651
413812	0705453	1061986	AM	AA	0	6	66	Lead	0.172000E+03	MG/KG	MAC652
413812	0705453	1061986	AM	AA	0	6	66	Chromium	0.392000E+03	MG/KG	MAC652
413812	0705453	1061986	AM	AA	0	6	66	Copper	0.771000E+03	MG/KG	MAC652
413812	0705453	1061986	AM	AA	6	12	66	Lead	0.720000E+02	MG/KG	MAC653
413812	0705453	1061986	AM	AA	6	12	66	Chromium	0.147000E+03	MG/KG	MAC653
413812	0705453	1061986	AM	AA	6	12	66	Copper	0.319000E+03	MG/KG	MAC653
413812	0705453	1061986	AM	AA	24	30	66	Lead	0.400000E+01	MG/KG	MAC654
413812	0705453	1061986	AM	AA	24	30	66	Chromium	0.670000E+01	MG/KG	MAC654
413812	0705453	1061986	AM	AA	24	30	66	Copper	0.540000E+01	MG/KG	MAC654
413814	0705435	1061986	AM	AA	0	6	69	Lead	0.420000E+02	MG/KG	MAC655
413814	0705435	1061986	AM	AA	0	6	69	Chromium	0.570000E+02	MG/KG	MAC655
413814	0705435	1061986	AM	AA	0	6	69	Copper	0.156000E+03	MG/KG	MAC655
413814	0705435	1061986	AM	AA	12	18	69	Lead	0.160000E+02	MG/KG	MAC656
413814	0705435	1061986	AM	AA	12	18	69	Chromium	0.760000E+01	MG/KG	MAC656
413814	0705435	1061986	AM	AA	12	18	69	Copper	0.200000E+02	MG/KG	MAC656
413814	0705435	1061986	AM	AA	24	30	69	Lead	0.710000E+01	MG/KG	MAC657
413814	0705435	1061986	AM	AA	24	30	69	Chromium	0.570000E+01	MG/KG	MAC657
413814	0705435	1061986	AM	AA	24	30	69	Copper	0.100000E+02	MG/KG	MAC657
413722	0705427	1031986	AM	AA	0	6	142	Lead	0.540000E+02	MG/KG	MAC658
413722	0705427	1031986	AM	AA	0	6	142	Chromium	0.600000E+02	MG/KG	MAC658
413722	0705427	1031986	AM	AA	0	6	142	Copper	0.145000E+03	MG/KG	MAC658
413722	0705427	1031986	AM	AA	12	18	142	Lead	0.440000E+02	MG/KG	MAC659
413722	0705427	1031986	AM	AA	12	18	142	Chromium	0.430000E+02	MG/KG	MAC659
413722	0705427	1031986	AM	AA	12	18	142	Copper	0.119000E+03	MG/KG	MAC659
413722	0705427	1031986	AM	AA	24	30	142	Lead	0.420000E+01	MG/KG	MAC660
413722	0705427	1031986	AM	AA	24	30	142	Chromium	0.500000E+01	MG/KG	MAC660
413722	0705427	1031986	AM	AA	24	30	142	Copper	0.420000E+01	MG/KG	MAC660
413702	0705445	1091986	AM	AA	0	6	158	Lead	0.920000E+01	MG/KG	MAC661
413702	0705445	1091986	AM	AA	0	6	158	Chromium	0.120000E+02	MG/KG	MAC661
413702	0705445	1091986	AM	AA	0	6	158	Copper	0.240000E+02	MG/KG	MAC661
413702	0705445	1091986	AM	AA	12	18	158	Lead	0.120000E+02	MG/KG	MAC662
413702	0705445	1091986	AM	AA	12	18	158	Chromium	0.680000E+01	MG/KG	MAC662
413702	0705445	1091986	AM	AA	12	18	158	Copper	0.170000E+02	MG/KG	MAC662
413702	0705445	1091986	AM	AA	24	30	158	Lead	0.200000E+02	MG/KG	MAC663
413702	0705445	1091986	AM	AA	24	30	158	Chromium	0.600000E+01	MG/KG	MAC663
413702	0705445	1091986	AM	AA	24	30	158	Copper	0.780000E+01	MG/KG	MAC663
413657	0705432	1091986	AM	AA	0	6	163	Lead	0.350000E+02	MG/KG	MAC664
413657	0705432	1091986	AM	AA	0	6	163	Chromium	0.340000E+02	MG/KG	MAC664
413657	0705432	1091986	AM	AA	0	6	163	Copper	0.650000E+02	MG/KG	MAC664
413657	0705432	1091986	AM	AA	12	18	163	Lead	0.350000E+02	MG/KG	MAC665
413657	0705432	1091986	AM	AA	12	18	163	Chromium	0.240000E+02	MG/KG	MAC665
413657	0705432	1091986	AM	AA	12	18	163	Copper	0.540000E+02	MG/KG	MAC665

413657	0705432	1091986	AM	AA	24	30	163	Chromium	0.120000E+02	MG/KG	MAC666
413657	0705432	1091986	AM	AA	24	30	163	Copper	0.220000E+02	MG/KG	MAC666
413657	0705432	1091986	AM	AA	30	36	163	Lead	0.690000E+01	MG/KG	MAC667
413657	0705432	1091986	AM	AA	30	36	163	Chromium	0.550000E+01	MG/KG	MAC667
413657	0705432	1091986	AM	AA	30	36	163	Copper	0.230000E+01	MG/KG	MAC667
413845	0705506	1161986	AM	AA	0	6	20	Lead	0.450000E+02	MG/KG	MAC668
413814	0705435	1021986	AM	AA	0	6	69	Lead	0.350000E+02	MG/KG	MAC669
413814	0705435	1021986	AM	AA	0	6	69	Chromium	0.490000E+02	MG/KG	MAC669
413814	0705435	1021986	AM	AA	0	6	69	Copper	0.127000E+03	MG/KG	MAC669
413816	0705459	1071986	AM	AA	0	6	57	Lead	0.990000E+02	MG/KG	MAC670
413816	0705459	1071986	AM	AA	0	6	57	Cadmium	0.540000E+01	MG/KG	MAC670
413816	0705459	1071986	AM	AA	0	6	57	Chromium	0.269000E+03	MG/KG	MAC670
413816	0705459	1071986	AM	AA	0	6	57	Copper	0.531000E+03	MG/KG	MAC670
413801	0705506	1101986	AM	AA	0	6	78	Lead	0.121000E+03	MG/KG	MAC671
413801	0705506	1101986	AM	AA	0	6	78	Chromium	0.100000E+03	MG/KG	MAC671
413801	0705506	1101986	AM	AA	0	6	78	Copper	0.272000E+03	MG/KG	MAC671
413851	0705520	1221986	AM	AA	24	30	12	Lead	0.840000E+01	MG/KG	MAC672
413851	0705520	1221986	AM	AA	24	30	12	Chromium	0.320000E+02	MG/KG	MAC672
413851	0705520	1221986	AM	AA	24	30	12	Copper	0.160000E+02	MG/KG	MAC672
413852	0705459	19860123	AM	AA	0	6	13	Lead	0.307000E+03	MG/KG	MAC673
413852	0705459	19860123	AM	AA	0	6	13	Cadmium	0.130000E+02	MG/KG	MAC673
413851	0705513	1231986	AM	AA	0	6	13	Chromium	0.696000E+03	MG/KG	MAC673
413852	0705459	19860123	AM	AA	0	6	13	Copper	0.152000E+04	MG/KG	MAC673
413852	0705459	19860123	AM	AA	12	18	13	Lead	0.157000E+03	MG/KG	MAC674
413852	0705459	19860123	AM	AA	12	18	13	Cadmium	0.760000E+01	MG/KG	MAC674
413851	0705513	1231986	AM	AA	12	18	13	Chromium	0.161000E+03	MG/KG	MAC674
413852	0705459	19860123	AM	AA	12	18	13	Copper	0.362000E+03	MG/KG	MAC674
413851	0705513	1231986	AM	AA	24	30	13	Lead	0.560000E+02	MG/KG	MAC675
413851	0705513	1231986	AM	AA	24	30	13	Chromium	0.170000E+02	MG/KG	MAC675
413851	0705513	1231986	AM	AA	24	30	13	Copper	0.520000E+02	MG/KG	MAC675
413851	0705453	1231986	AM	AA	0	6	16	Lead	0.152000E+03	MG/KG	MAC676
413851	0705453	1231986	AM	AA	0	6	16	Chromium	0.250000E+03	MG/KG	MAC676
413851	0705453	1231986	AM	AA	0	6	16	Copper	0.652000E+03	MG/KG	MAC676
413839	0705445	19860124	AM	AA	6	12	26	Lead	0.262000E+03	MG/KG	MAC677
413839	0705445	19860124	AM	AA	6	12	26	Chromium	0.528000E+03	MG/KG	MAC677
413839	0705445	19860124	AM	AA	6	12	26	Copper	0.125000E+04	MG/KG	MAC677
413839	0705445	19860124	AM	AA	18	NA	26	Lead	0.130000E+02	MG/KG	MAC678
413839	0705445	19860124	AM	AA	18	NA	26	Chromium	0.350000E+02	MG/KG	MAC678
413839	0705445	19860124	AM	AA	18	NA	26	Copper	0.210000E+02	MG/KG	MAC678
413839	0705445	19860124	AM	AA	18	NA	26	Lead	0.800000E+01	MG/KG	MAC679
413839	0705445	19860124	AM	AA	18	NA	26	Chromium	0.290000E+02	MG/KG	MAC679
413844	0705434	19860124	AM	AA	6	12	29	Lead	0.346000E+03	MG/KG	MAC680
413844	0705434	19860124	AM	AA	6	12	29	Chromium	0.267000E+03	MG/KG	MAC680
413844	0705434	19860124	AM	AA	6	12	29	Copper	0.107000E+04	MG/KG	MAC680
413844	0705434	19860124	AM	AA	18	NA	29	Lead	0.900000E+01	MG/KG	MAC681
413844	0705434	19860124	AM	AA	18	NA	29	Chromium	0.120000E+02	MG/KG	MAC681

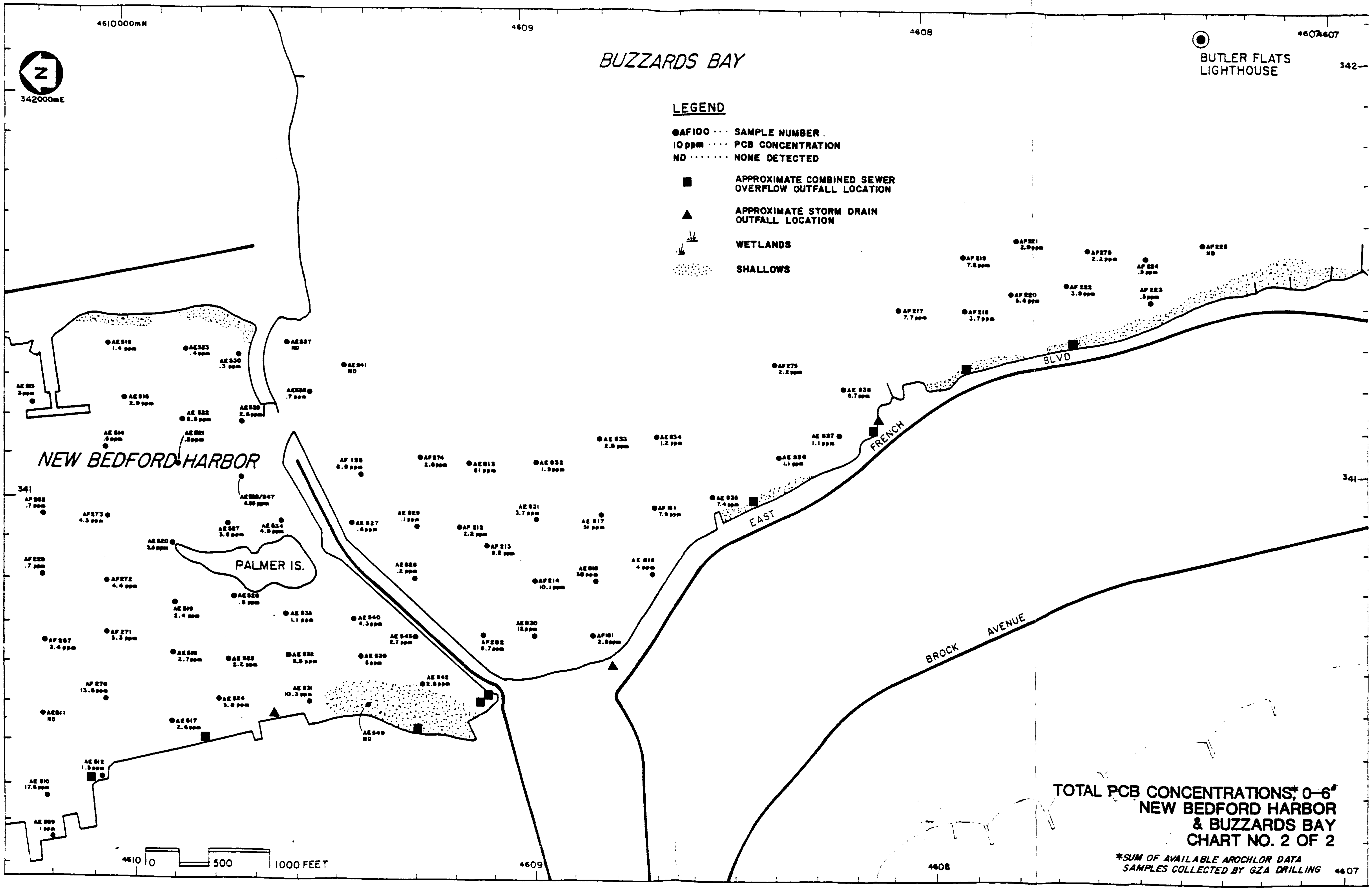
413844	0705434	19860124	AM	AA	18	NA	29	Lead	0.600000E+01	MG/KG	MAC682
413844	0705434	19860124	AM	AA	18	NA	29	Chromium	0.120000E+02	MG/KG	MAC682
413844	0705434	19860124	AM	AA	18	NA	29	Copper	0.170000E+02	MG/KG	MAC682
413829	0705439	19860130	AM	AA	6	12	40	Lead	0.152000E+03	MG/KG	MAC683
413829	0705439	19860130	AM	AA	6	12	40	Chromium	0.930000E+02	MG/KG	MAC683
413829	0705439	19860130	AM	AA	6	12	40	Copper	0.222000E+03	MG/KG	MAC683
413829	0705439	19860130	AM	AA	18	NA	40	Lead	0.108000E+03	MG/KG	MAC684
413829	0705439	19860130	AM	AA	18	NA	40	Chromium	0.900000E+02	MG/KG	MAC684
413829	0705439	19860130	AM	AA	18	NA	40	Copper	0.292000E+03	MG/KG	MAC684
413829	0705439	19860130	AM	AA	18	NA	40	Lead	0.140000E+02	MG/KG	MAC685
413829	0705439	19860130	AM	AA	18	NA	40	Chromium	0.240000E+02	MG/KG	MAC685
413829	0705439	19860130	AM	AA	18	NA	40	Copper	0.360000E+02	MG/KG	MAC685
413822	0705458	19860205	AM	AA	6	12	45	Lead	0.190000E+03	MG/KG	MAC686
413822	0705458	19860205	AM	AA	6	12	45	Chromium	0.353000E+03	MG/KG	MAC686
413822	0705458	19860205	AM	AA	6	12	45	Copper	0.662000E+03	MG/KG	MAC686
413822	0705458	19860205	AM	AA	18	NA	45	Lead	0.118000E+03	MG/KG	MAC687
413822	0705458	19860205	AM	AA	18	NA	45	Chromium	0.255000E+03	MG/KG	MAC687
413822	0705458	19860205	AM	AA	18	NA	45	Copper	0.497000E+03	MG/KG	MAC687
413822	0705458	19860205	AM	AA	18	NA	45	Lead	0.360000E+02	MG/KG	MAC688
413822	0705458	19860205	AM	AA	18	NA	45	Chromium	0.690000E+02	MG/KG	MAC688
413822	0705458	19860205	AM	AA	18	NA	45	Copper	0.134000E+03	MG/KG	MAC688
413817	0705422	19860131	AM	AA	6	12	49	Lead	0.840000E+02	MG/KG	MAC689
413817	0705422	19860131	AM	AA	6	12	49	Chromium	0.540000E+02	MG/KG	MAC689
413817	0705422	19860131	AM	AA	6	12	49	Copper	0.850000E+02	MG/KG	MAC689
413820	0705449	19860206	AM	AA	6	12	51	Lead	0.272000E+03	MG/KG	MAC690
413820	0705449	19860206	AM	AA	6	12	51	Chromium	0.420000E+03	MG/KG	MAC690
413820	0705449	19860206	AM	AA	6	12	51	Copper	0.737000E+03	MG/KG	MAC690
413759	0705437	19860129	AM	AA	6	12	80	Lead	0.155000E+03	MG/KG	MAC691
413759	0705437	19860129	AM	AA	6	12	80	Chromium	0.260000E+03	MG/KG	MAC691
413759	0705437	19860129	AM	AA	6	12	80	Copper	0.408000E+03	MG/KG	MAC691
413759	0705437	19860129	AM	AA	18	NA	80	Lead	0.155000E+03	MG/KG	MAC692
413759	0705437	19860129	AM	AA	18	NA	80	Chromium	0.222000E+03	MG/KG	MAC692
413759	0705437	19860129	AM	AA	18	NA	80	Copper	0.524000E+03	MG/KG	MAC692
413759	0705437	19860129	AM	AA	18	NA	80	Lead	0.120000E+02	MG/KG	MAC693
413759	0705437	19860129	AM	AA	18	NA	80	Chromium	0.120000E+02	MG/KG	MAC693
413759	0705437	19860129	AM	AA	18	NA	80	Copper	0.270000E+02	MG/KG	MAC693
413738	0705427	19860118	AM	AA	6	12	112	Lead	0.139000E+03	MG/KG	MAC694
413738	0705427	19860118	AM	AA	6	12	112	Chromium	0.106000E+03	MG/KG	MAC694
413738	0705427	19860118	AM	AA	18	NA	112	Lead	0.530000E+02	MG/KG	MAC695
413738	0705427	19860118	AM	AA	18	NA	112	Chromium	0.150000E+02	MG/KG	MAC695
413738	0705427	19860118	AM	AA	18	NA	112	Copper	0.430000E+02	MG/KG	MAC695
413738	0705427	19860118	AM	AA	18	NA	112	Lead	0.300000E+02	MG/KG	MAC696
413738	0705427	19860118	AM	AA	18	NA	112	Chromium	0.700000E+01	MG/KG	MAC696
413738	0705427	19860118	AM	AA	18	NA	112	Copper	0.140000E+02	MG/KG	MAC696
413711	0705435	19851219	AM	AA	18	NA	144	Lead	0.420000E+02	MG/KG	MAC697
413711	0705435	19851219	AM	AA	18	NA	144	Chromium	0.360000E+02	MG/KG	MAC697

413711	0705435	19851219	AM	AA	18	NA	144	Copper	0.750000E+02	MG/KG	MAC697
413711	0705435	19851219	AM	AA	18	NA	144	Lead	0.500000E+02	MG/KG	MAC698
413711	0705435	19851219	AM	AA	18	NA	144	Chromium	0.470000E+02	MG/KG	MAC698
413711	0705435	19851219	AM	AA	18	NA	144	Copper	0.107000E+03	MG/KG	MAC698
413822	0705458	19860205	AM	AA	18	NA	45	Lead	0.470000E+02	MG/KG	MAC699
413822	0705458	19860205	AM	AA	18	NA	45	Chromium	0.400000E+02	MG/KG	MAC699
413822	0705458	19860205	AM	AA	18	NA	45	Copper	0.960000E+02	MG/KG	MAC699
		19860204	AM	AO	NA	NA	BLANK	Lead	0.400000E+01	MG/KG	MAC700
413843	0705443		AM	AA	30	42	29	Lead		MG/KG	MAD533
413843	0705443		AM	AA	30	42	29	Cadmium	0.320000E+01	MG/KG	MAD533
413843	0705443		AM	AA	30	42	29	Chromium	0.460000E+01	MG/KG	MAD533
413843	0705443		AM	AA	30	42	29	Copper	0.540000E+01	MG/KG	MAD533
413851	0705500	1231986	AM	AA	18	24	15	Lead	0.420000E+01	MG/KG	MAD534
413851	0705500	1231986	AM	AA	18	24	15	Cadmium		MG/KG	MAD534
413851	0705500	1231986	AM	AA	18	24	15	Chromium	0.460000E+01	MG/KG	MAD534
413851	0705500	1231986	AM	AA	18	24	15	Copper	0.120000E+02	MG/KG	MAD534
413851	0705500	1231986	AM	AA	24	30	15	Lead	0.340000E+01	MG/KG	MAD535
413851	0705500	1231986	AM	AA	24	30	15	Cadmium		MG/KG	MAD535
413851	0705500	1231986	AM	AA	24	30	15	Chromium	0.470000E+01	MG/KG	MAD535
413851	0705500	1231986	AM	AA	24	30	15	Copper	0.110000E+02	MG/KG	MAD535
413657	0705432	1091986	AM	AA	24	30	163	Lead	0.150000E+02	MG/KG	MQC666

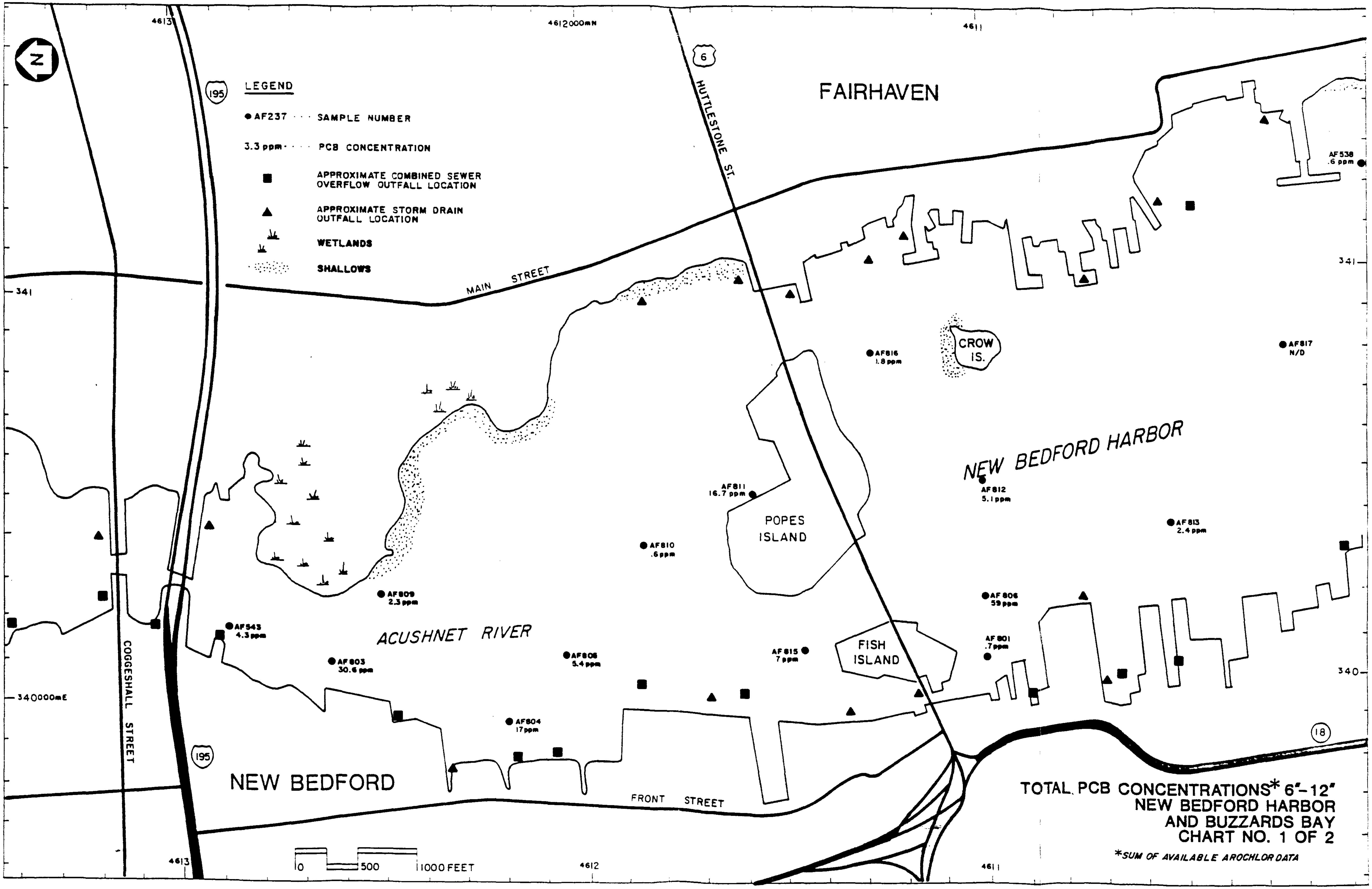


TOTAL PCB CONCENTRATIONS* 0–6"
NEW BEDFORD HARBOR
& BUZZARDS BAY
CHART NO. 1 OF 2

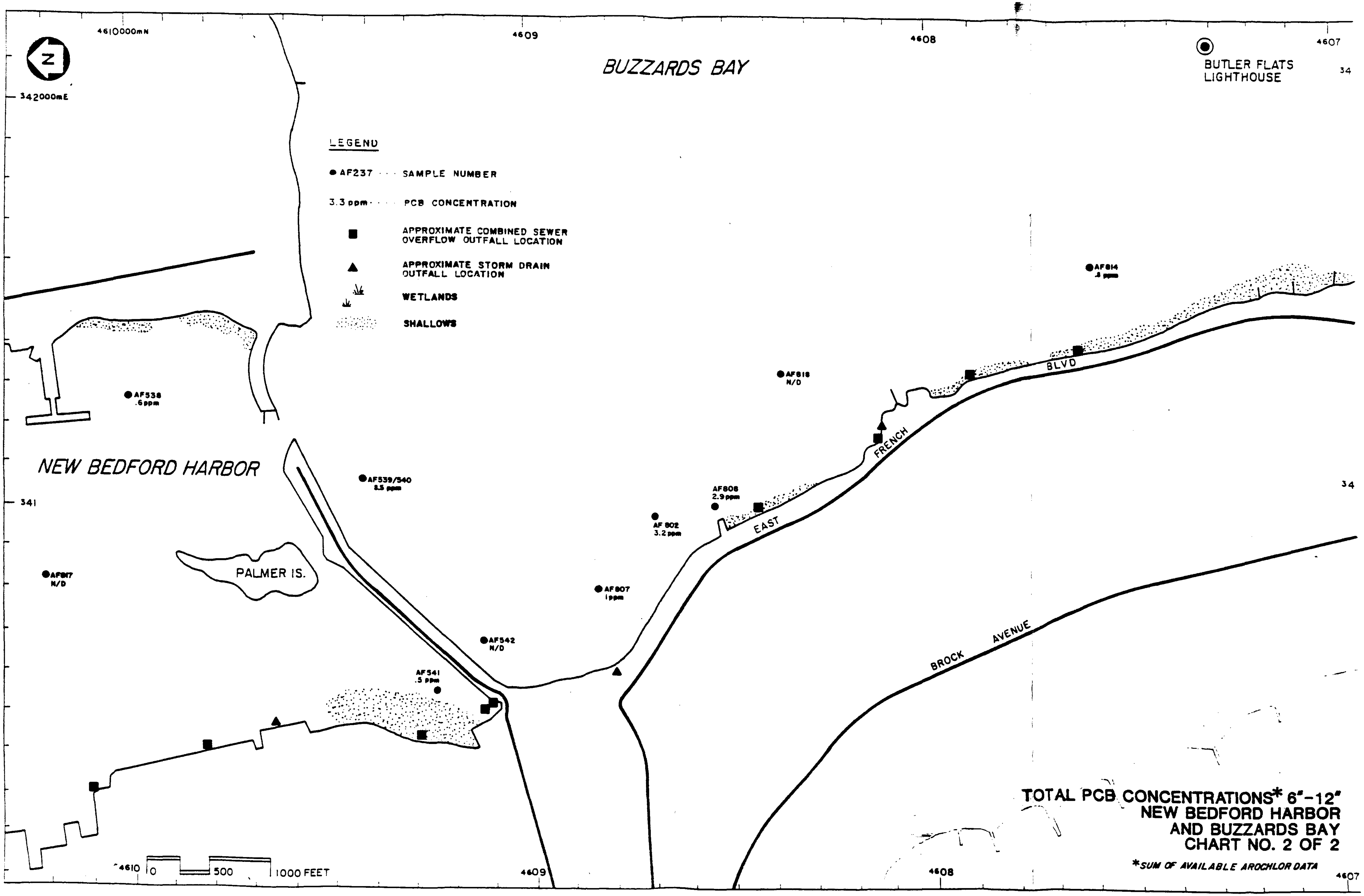
*SUM OF AVAILABLE AROCHLOR DATA
SAMPLES COLLECTED BY GZA DRILLING



BUZZARDS BAY
BUTLER FLATS LIGHTHOUSE
LEGEND
●AF100 ··· SAMPLE NUMBER.
10 ppm ···· PCB CONCENTRATION
ND ······· NONE DETECTED
APPROXIMATE COMBINED SEWER OVERFLOW OUTFALL LOCATION
APPROXIMATE STORM DRAIN OUTFALL LOCATION
WETLANDS
SHALLOWS
NEW BEDFORD HARBOR
PALMER IS.
EAST FRENCH BLVD
BROCK AVENUE
0 500 1000 FEET
TOTAL PCB CONCENTRATIONS* 0–6"
NEW BEDFORD HARBOR
& BUZZARDS BAY
CHART NO. 2 OF 2
*SUM OF AVAILABLE AROCHLOR DATA
SAMPLES COLLECTED BY GZA DRILLING

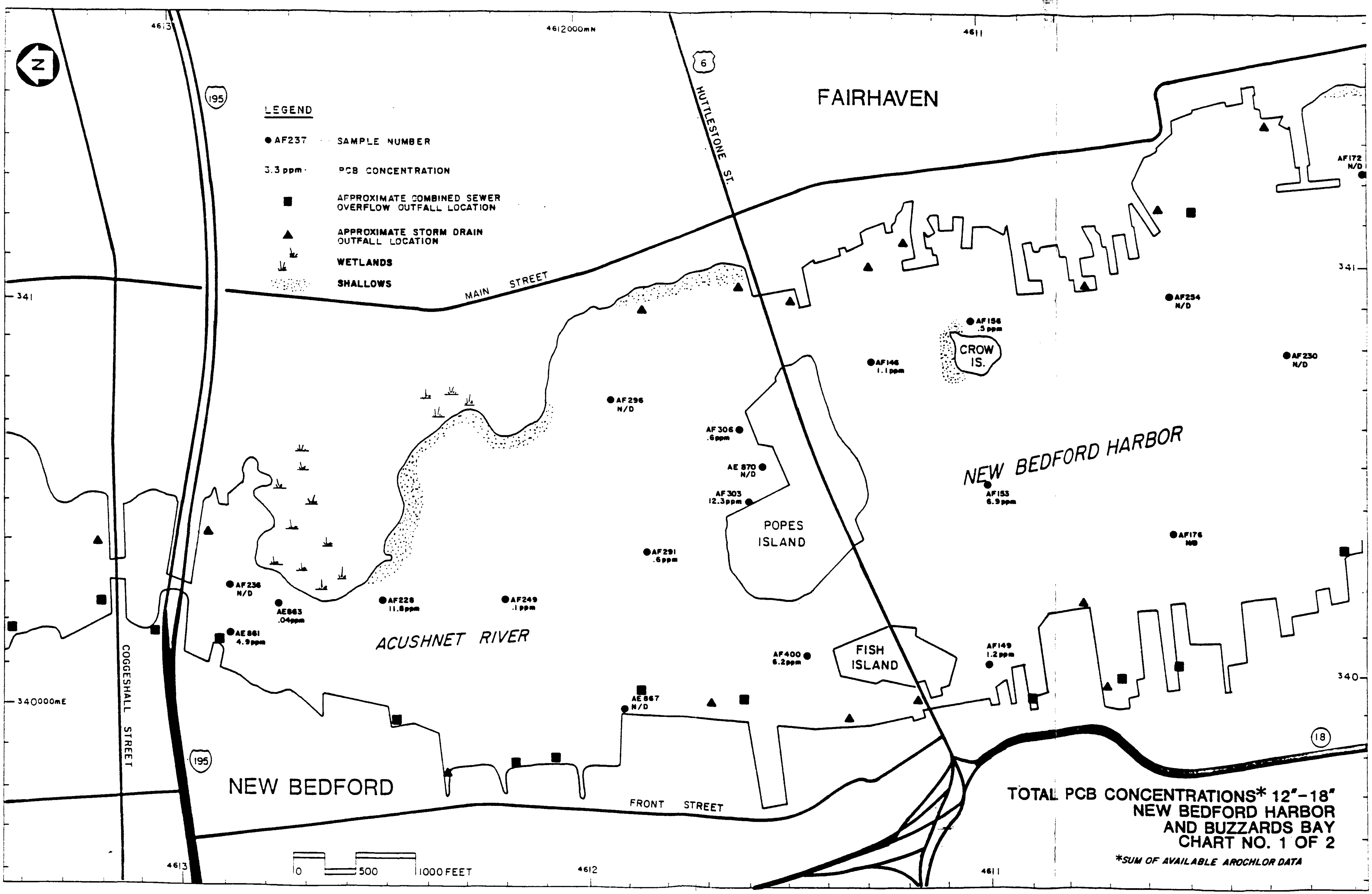


LEGEND
AF237 SAMPLE NUMBER
3.3 ppm PCB CONCENTRATION
APPROXIMATE COMBINED SEWER OVERFLOW OUTFALL LOCATION
APPROXIMATE STORM DRAIN OUTFALL LOCATION
WETLANDS
SHALLOWS
4613
4612000mN
4611
4612
341
340
340000mE
195
6
18
HUTTLESTONE ST.
FAIRHAVEN
MAIN STREET
COGGESHALL STREET
FRONT STREET
NEW BEDFORD
ACUSHNET RIVER
NEW BEDFORD HARBOR
POPES ISLAND
FISH ISLAND
CROW IS.
AF538 .6 ppm
AF816 1.8 ppm
AF817 N/D
AF811 16.7 ppm
AF812 5.1 ppm
AF813 2.4 ppm
AF810 .6 ppm
AF809 2.3 ppm
AF806 59 ppm
AF543 4.3 ppm
AF801 .7 ppm
AF815 7 ppm
AF805 5.4 ppm
AF803 30.6 ppm
AF804 17 ppm
0 500 1000 FEET
TOTAL PCB CONCENTRATIONS* 6"-12"
NEW BEDFORD HARBOR
AND BUZZARDS BAY
CHART NO. 1 OF 2
*SUM OF AVAILABLE AROCHLOR DATA



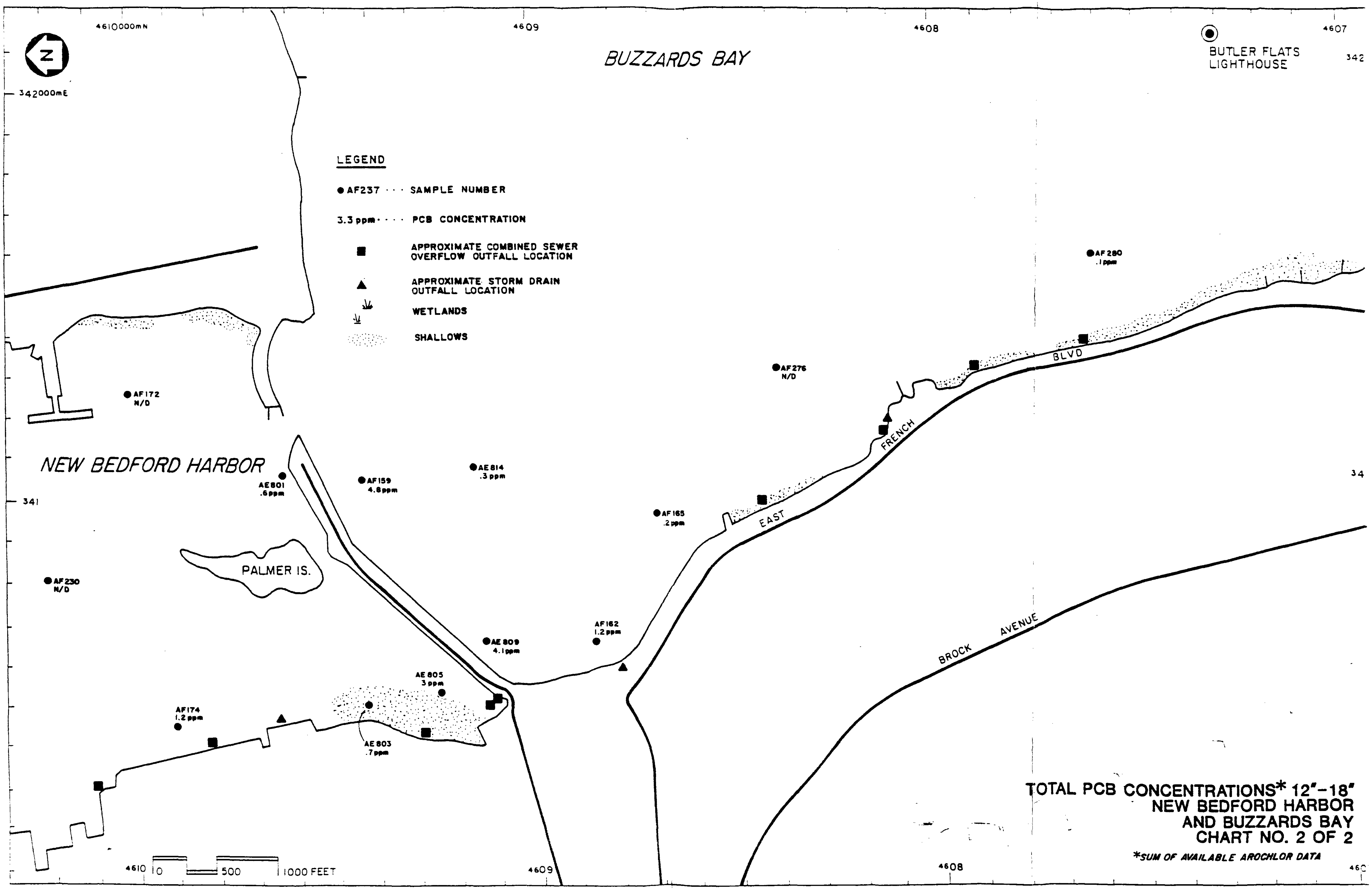
TOTAL PCB CONCENTRATIONS* 6"–12"
NEW BEDFORD HARBOR
AND BUZZARDS BAY
CHART NO. 2 OF 2

**SUM OF AVAILABLE AROCHLOR DATA*



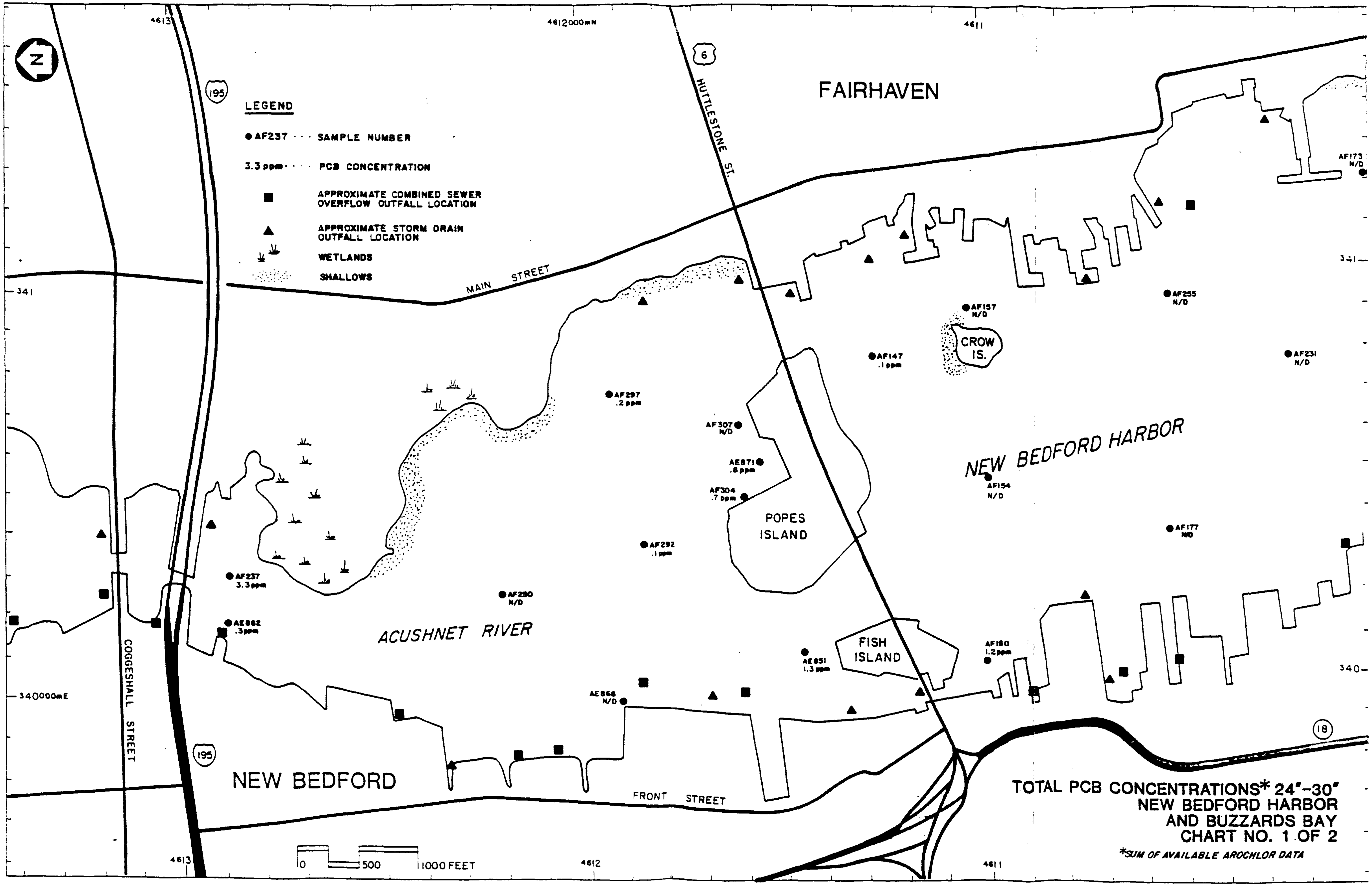
TOTAL PCB CONCENTRATIONS* 12"–18"
NEW BEDFORD HARBOR
AND BUZZARDS BAY
CHART NO. 1 OF 2

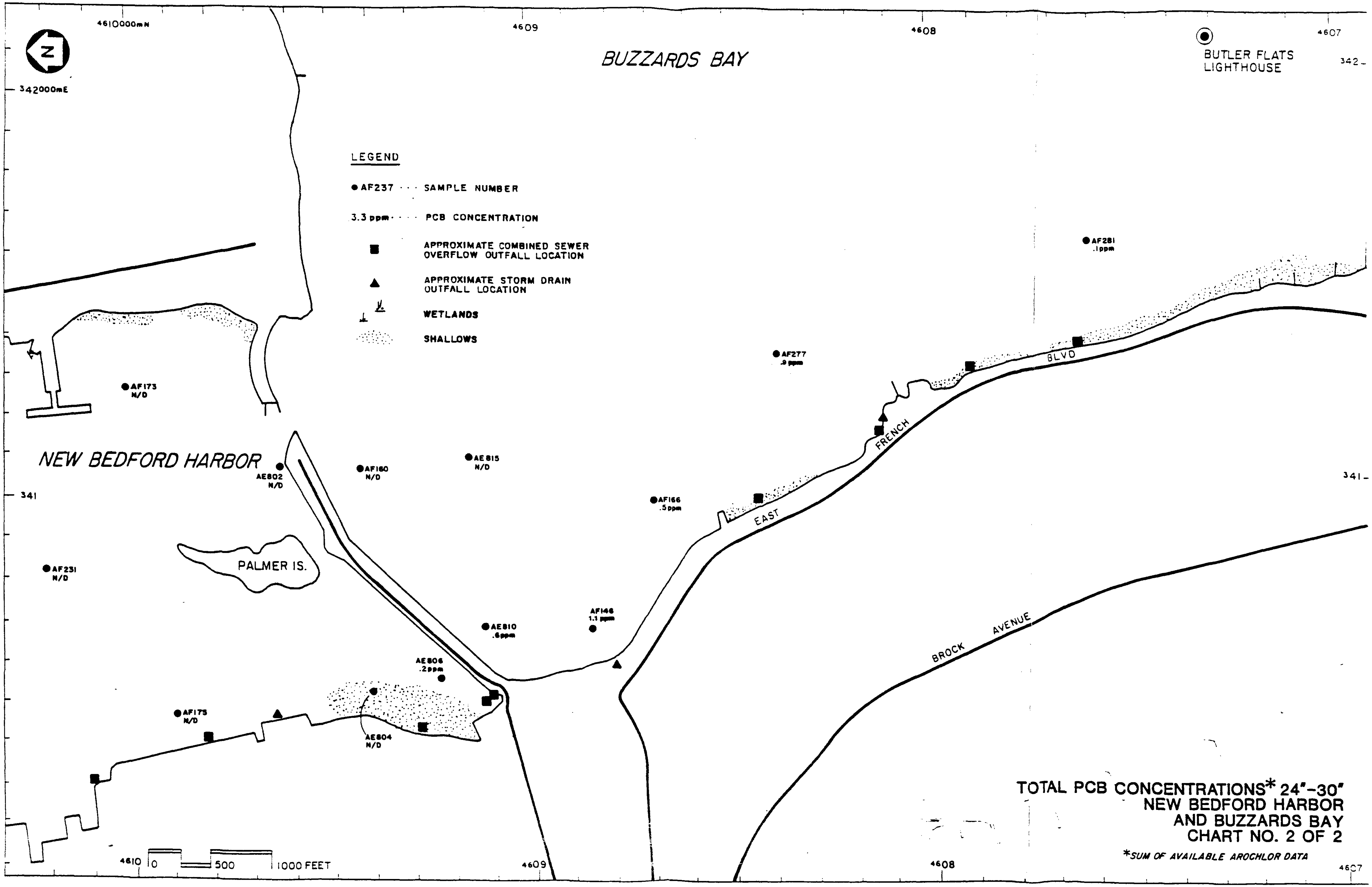
*SUM OF AVAILABLE AROCHLOR DATA



TOTAL PCB CONCENTRATIONS* 12"–18"
NEW BEDFORD HARBOR
AND BUZZARDS BAY
CHART NO. 2 OF 2

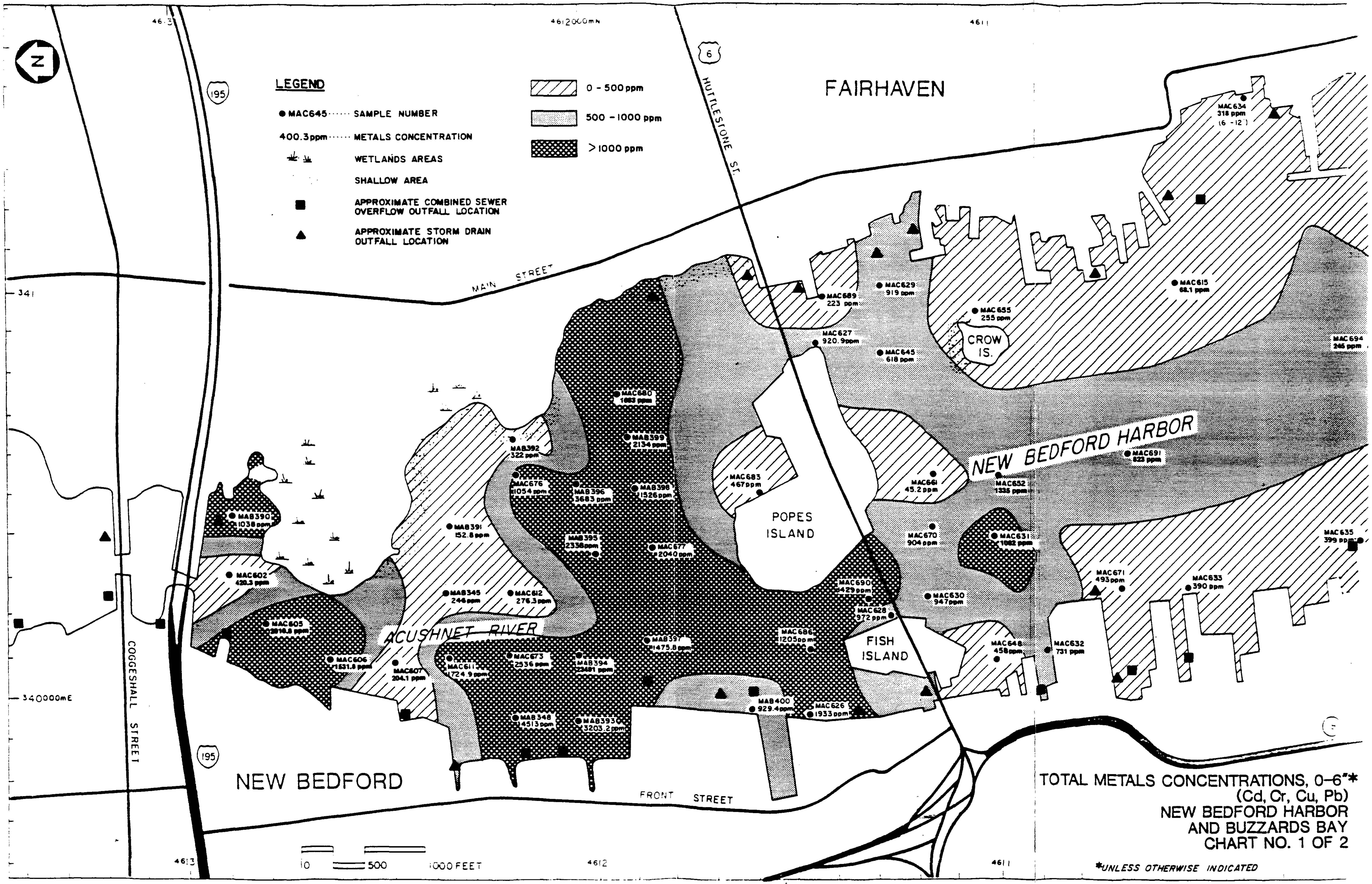
*SUM OF AVAILABLE AROCHLOR DATA


FAIRHAVEN
NEW BEDFORD
NEW BEDFORD HARBOR
ACUSHNET RIVER
LEGEND
● AF237 · · · SAMPLE NUMBER
3.3 ppm · · · PCB CONCENTRATION
APPROXIMATE COMBINED SEWER OVERFLOW OUTFALL LOCATION
APPROXIMATE STORM DRAIN OUTFALL LOCATION
WETLANDS
SHALLOWS
HUTTLESTONE ST.
MAIN STREET
FRONT STREET
COGGESHALL STREET
POPES ISLAND
FISH ISLAND
CROW IS.
AF237 3.3 ppm
AE862 .3 ppm
AF290 N/D
AF297 .2 ppm
AF307 N/D
AE871 .8 ppm
AF304 .7 ppm
AF292 .1 ppm
AE868 N/D
AE851 1.3 ppm
AF147 .1 ppm
AF157 N/D
AF255 N/D
AF231 N/D
AF154 N/D
AF177 N/D
AF150 1.2 ppm
AF173 N/D
0 500 1000 FEET
4612000mN
340000mE
TOTAL PCB CONCENTRATIONS* 24"-30"
NEW BEDFORD HARBOR
AND BUZZARDS BAY
CHART NO. 1 OF 2
*SUM OF AVAILABLE AROCHLOR DATA



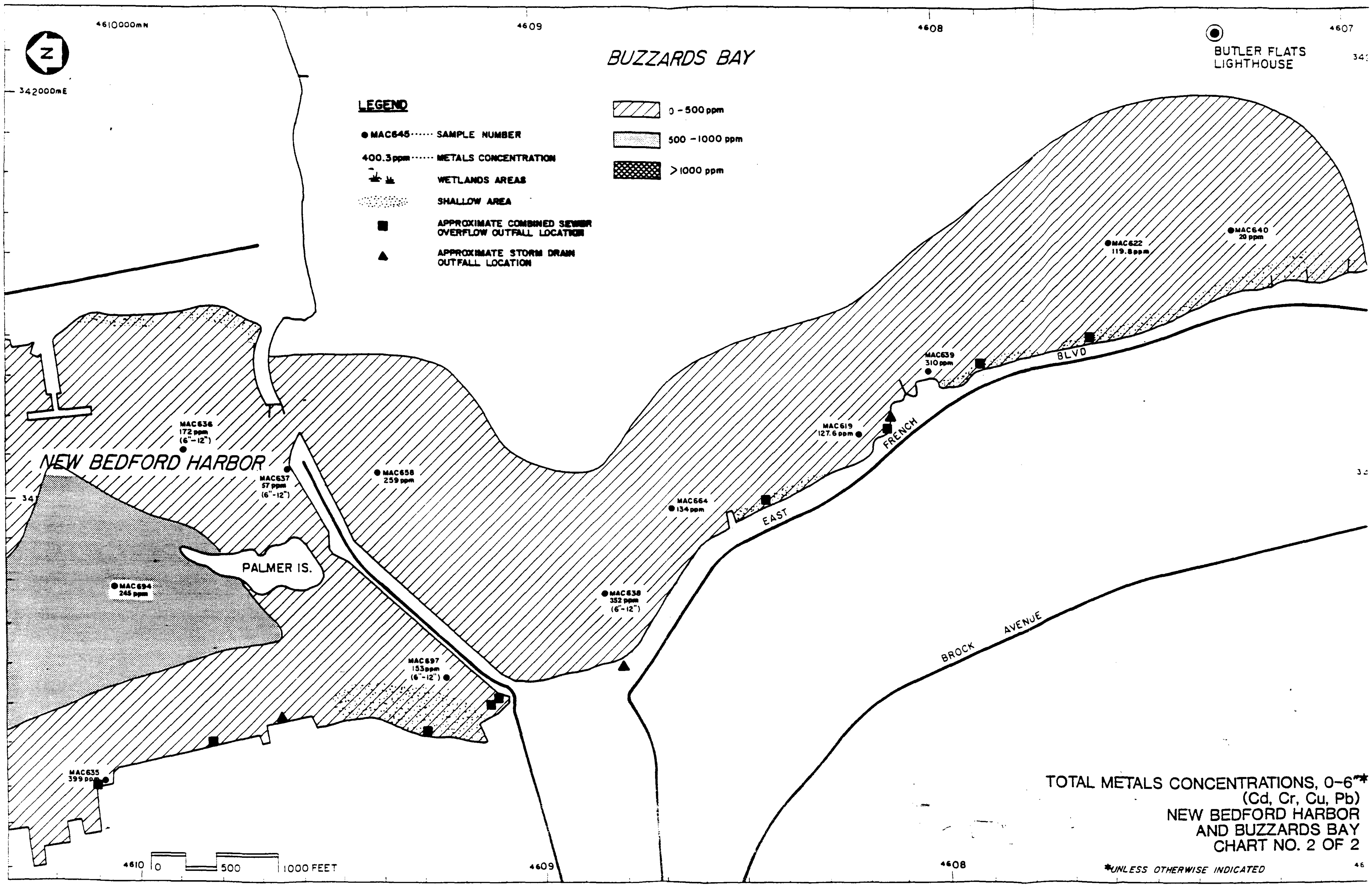
TOTAL PCB CONCENTRATIONS* 24"-30"
NEW BEDFORD HARBOR
AND BUZZARDS BAY
CHART NO. 2 OF 2

*SUM OF AVAILABLE AROCHLOR DATA



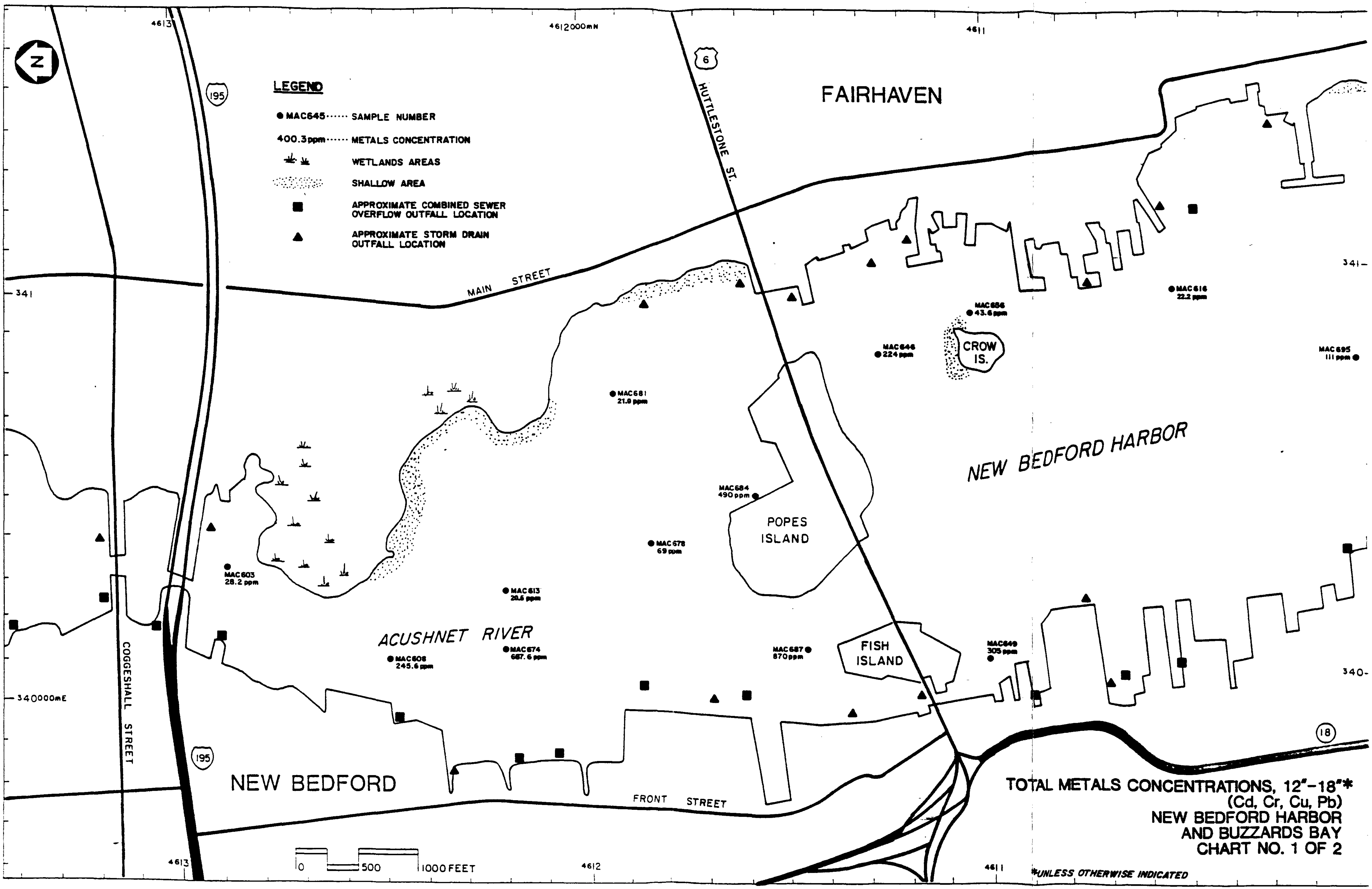
TOTAL METALS CONCENTRATIONS, 0–6"*
(Cd, Cr, Cu, Pb)
NEW BEDFORD HARBOR
AND BUZZARDS BAY
CHART NO. 1 OF 2

*UNLESS OTHERWISE INDICATED

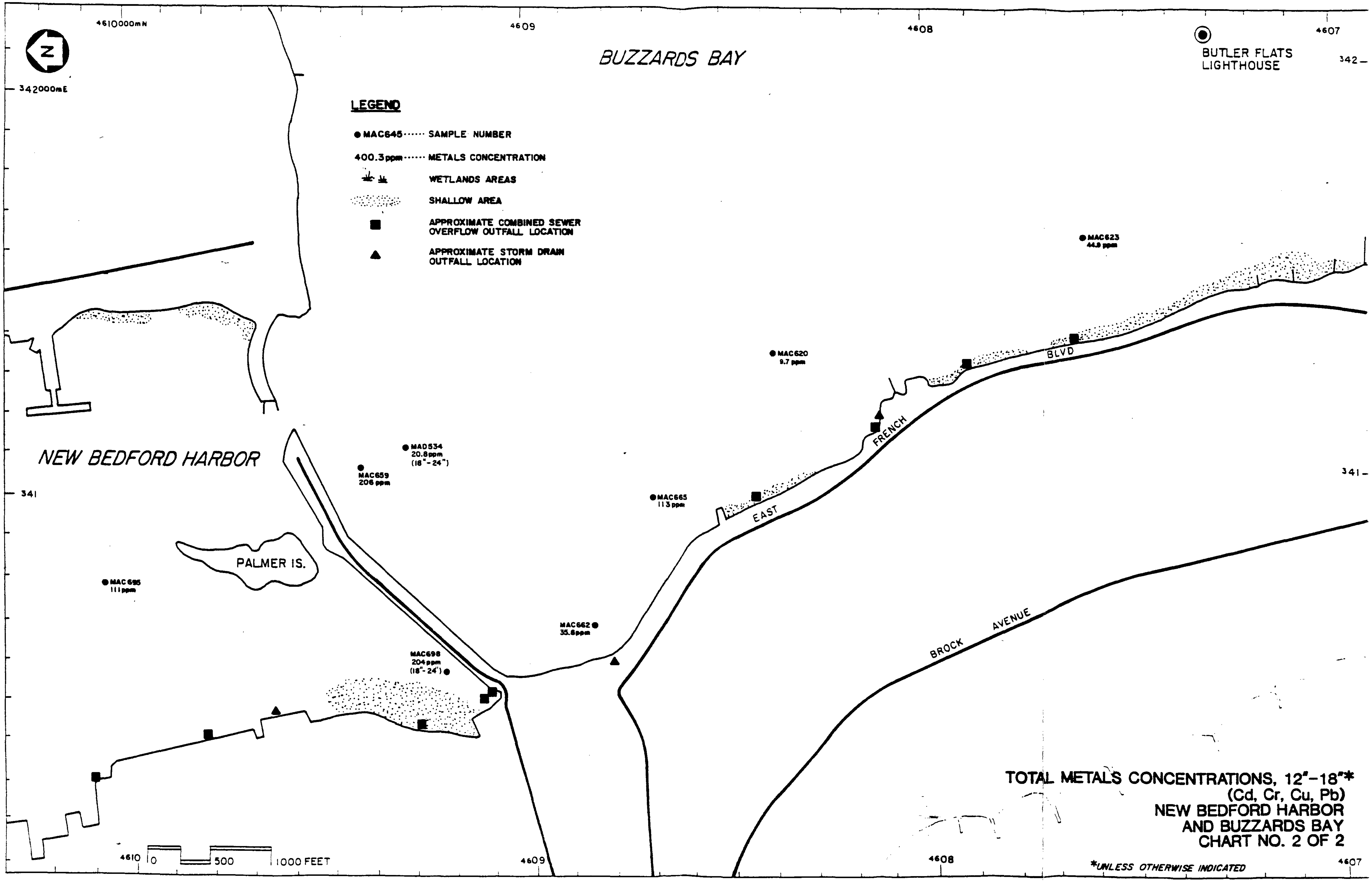


TOTAL METALS CONCENTRATIONS, 0-6"*
(Cd, Cr, Cu, Pb)
NEW BEDFORD HARBOR
AND BUZZARDS BAY
CHART NO. 2 OF 2

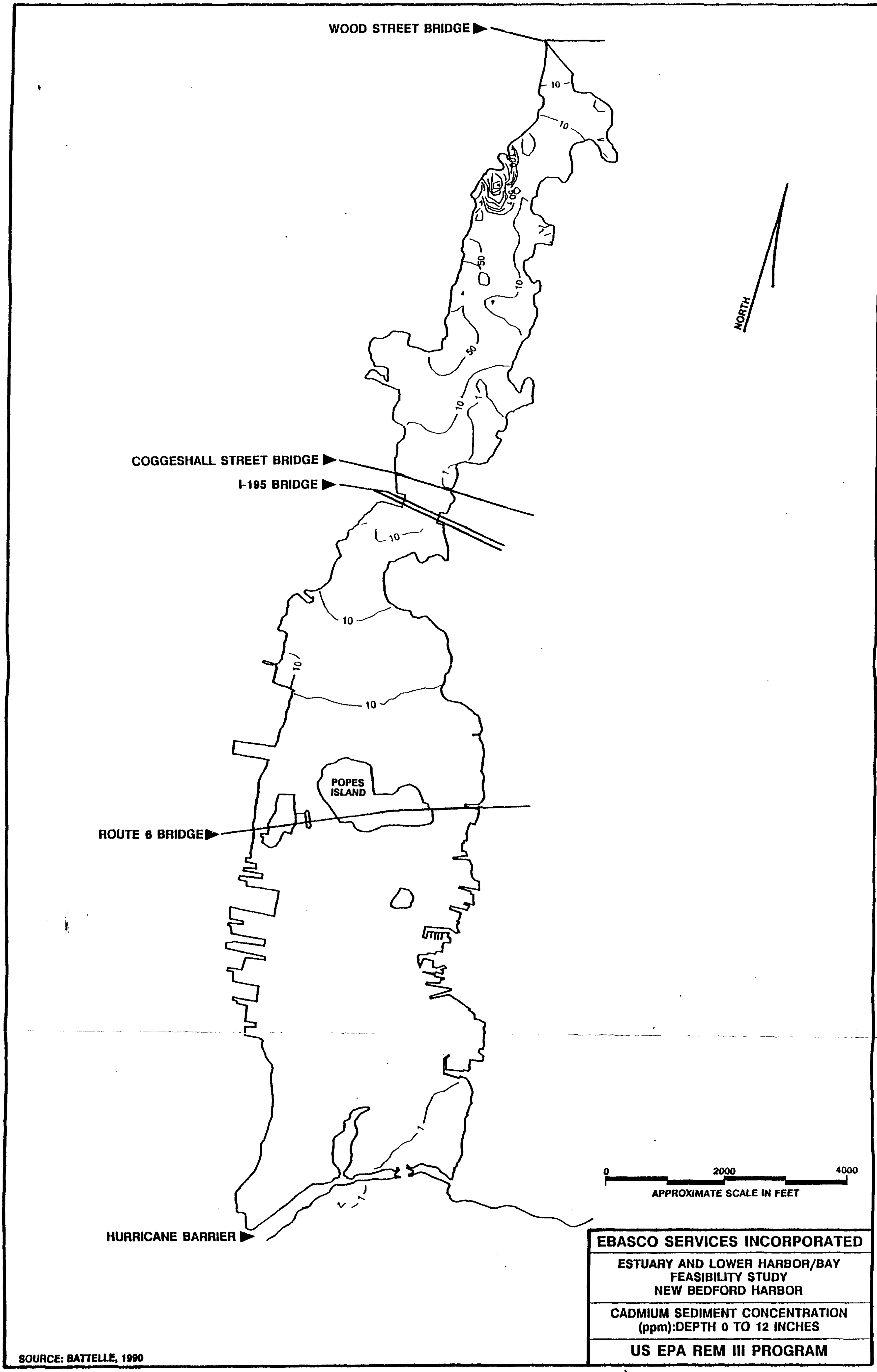
*UNLESS OTHERWISE INDICATED



LEGEND
MAC645 ······ SAMPLE NUMBER
400.3 ppm ······ METALS CONCENTRATION
WETLANDS AREAS
SHALLOW AREA
APPROXIMATE COMBINED SEWER OVERFLOW OUTFALL LOCATION
APPROXIMATE STORM DRAIN OUTFALL LOCATION
4613
4612000mN
4611
341
340000mE
340
195
6
18
HUTTLESTONE ST.
MAIN STREET
FRONT STREET
COGGESHALL STREET
FAIRHAVEN
NEW BEDFORD
NEW BEDFORD HARBOR
ACUSHNET RIVER
POPES ISLAND
FISH ISLAND
CROW IS.
MAC603 28.2 ppm
MAC608 245.6 ppm
MAC613 20.6 ppm
MAC674 687.6 ppm
MAC681 21.0 ppm
MAC678 69 ppm
MAC684 490 ppm
MAC687 870 ppm
MAC646 224 ppm
MAC656 43.6 ppm
MAC616 22.2 ppm
MAC695 111 ppm
MAC649 305 ppm
0 500 1000 FEET
TOTAL METALS CONCENTRATIONS, 12"–18"*
(Cd, Cr, Cu, Pb)
NEW BEDFORD HARBOR
AND BUZZARDS BAY
CHART NO. 1 OF 2
*UNLESS OTHERWISE INDICATED



TOTAL METALS CONCENTRATIONS, 12"–18"*
(Cd, Cr, Cu, Pb)
NEW BEDFORD HARBOR
AND BUZZARDS BAY
CHART NO. 2 OF 2

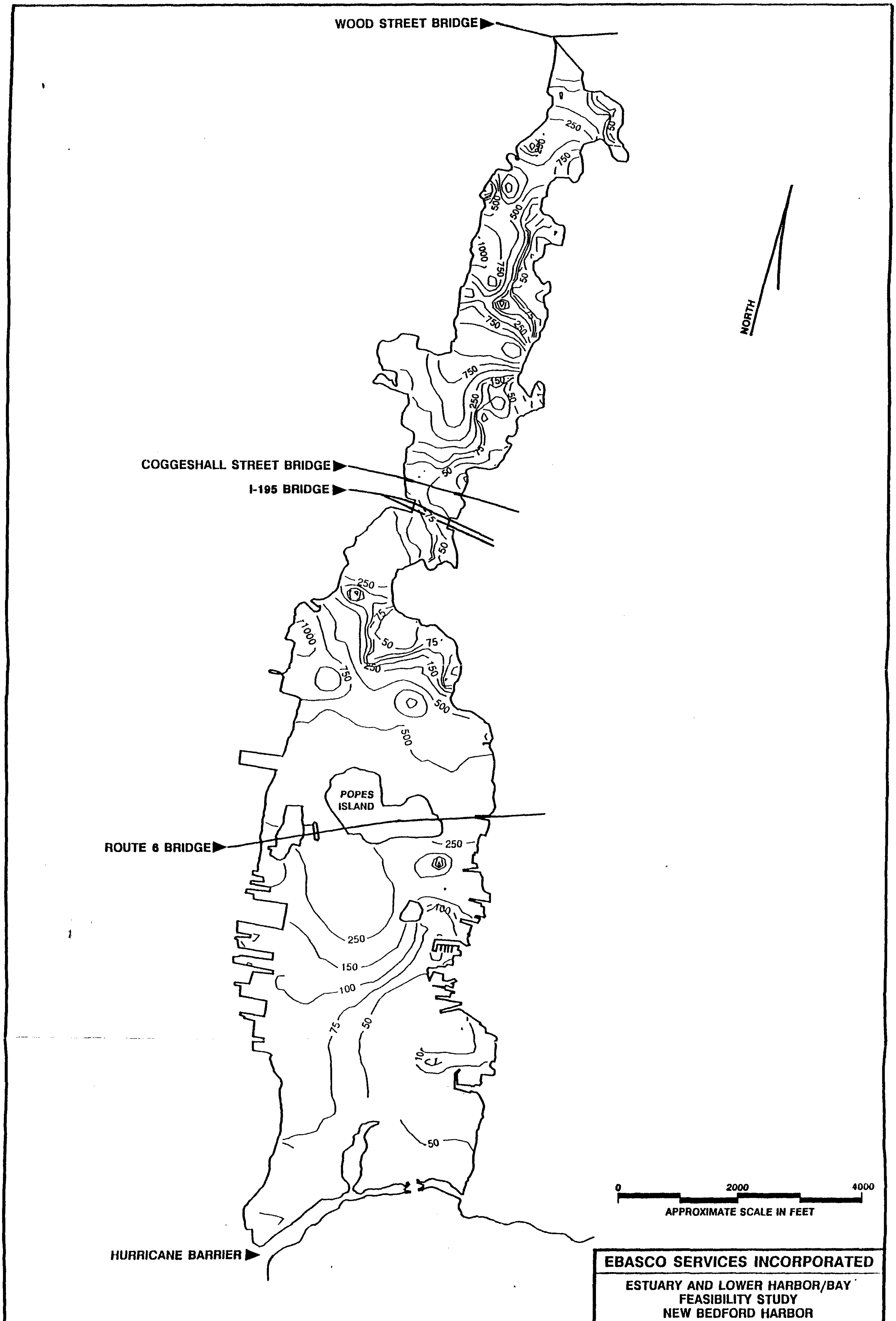


EBASCO SERVICES INCORPORATED

ESTUARY AND LOWER HARBOR/BAY FEASIBILITY STUDY NEW BEDFORD HARBOR

CADMIUM SEDIMENT CONCENTRATION (ppm):DEPTH 0 TO 12 INCHES

US EPA REM III PROGRAM



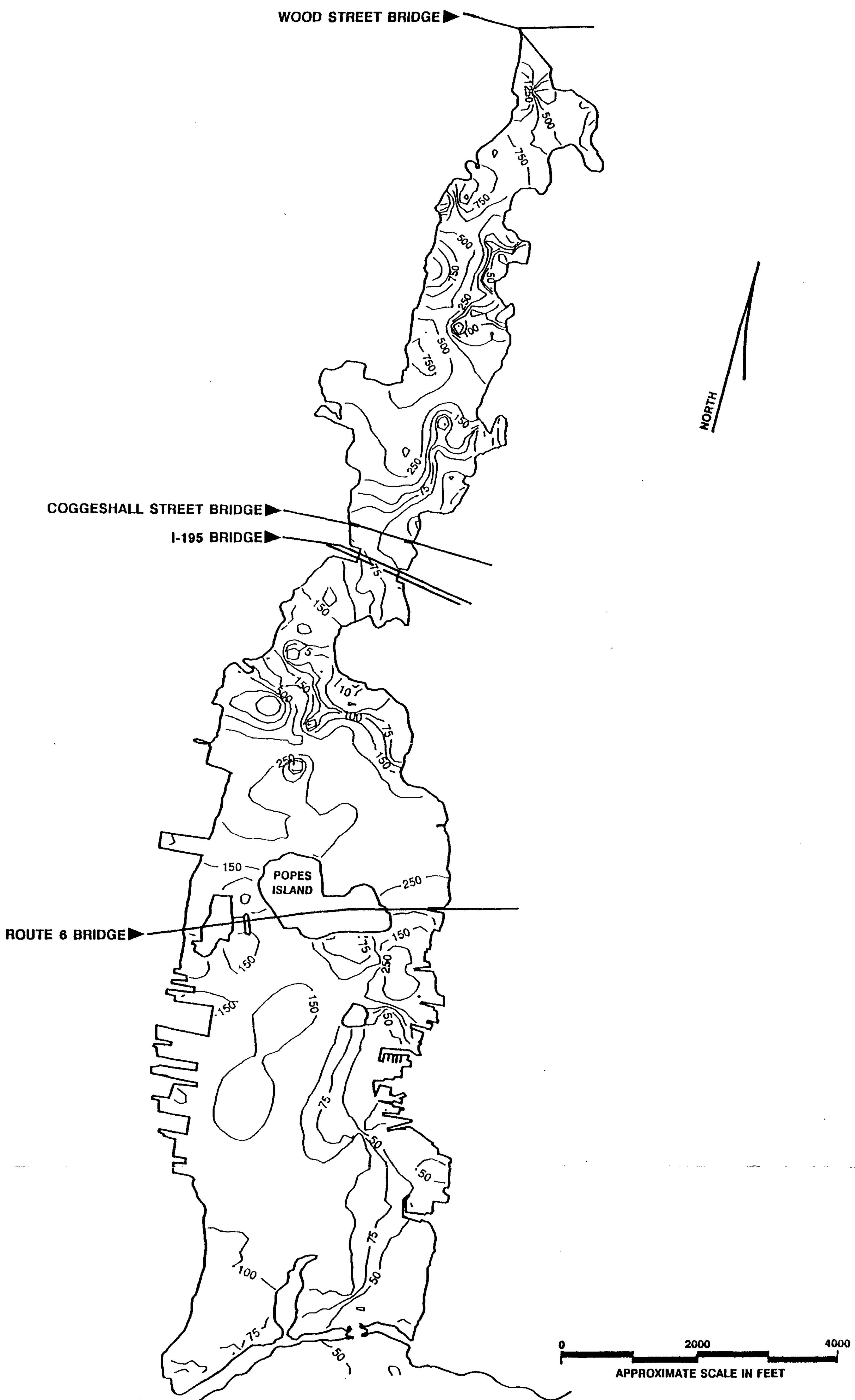
EBASCO SERVICES INCORPORATED

ESTUARY AND LOWER HARBOR/BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR

CHROMIUM SEDIMENT CONCENTRATION
(ppm):DEPTH 0 TO 12 INCHES

US EPA REM III PROGRAM

SOURCE: BATTELLE, 1990



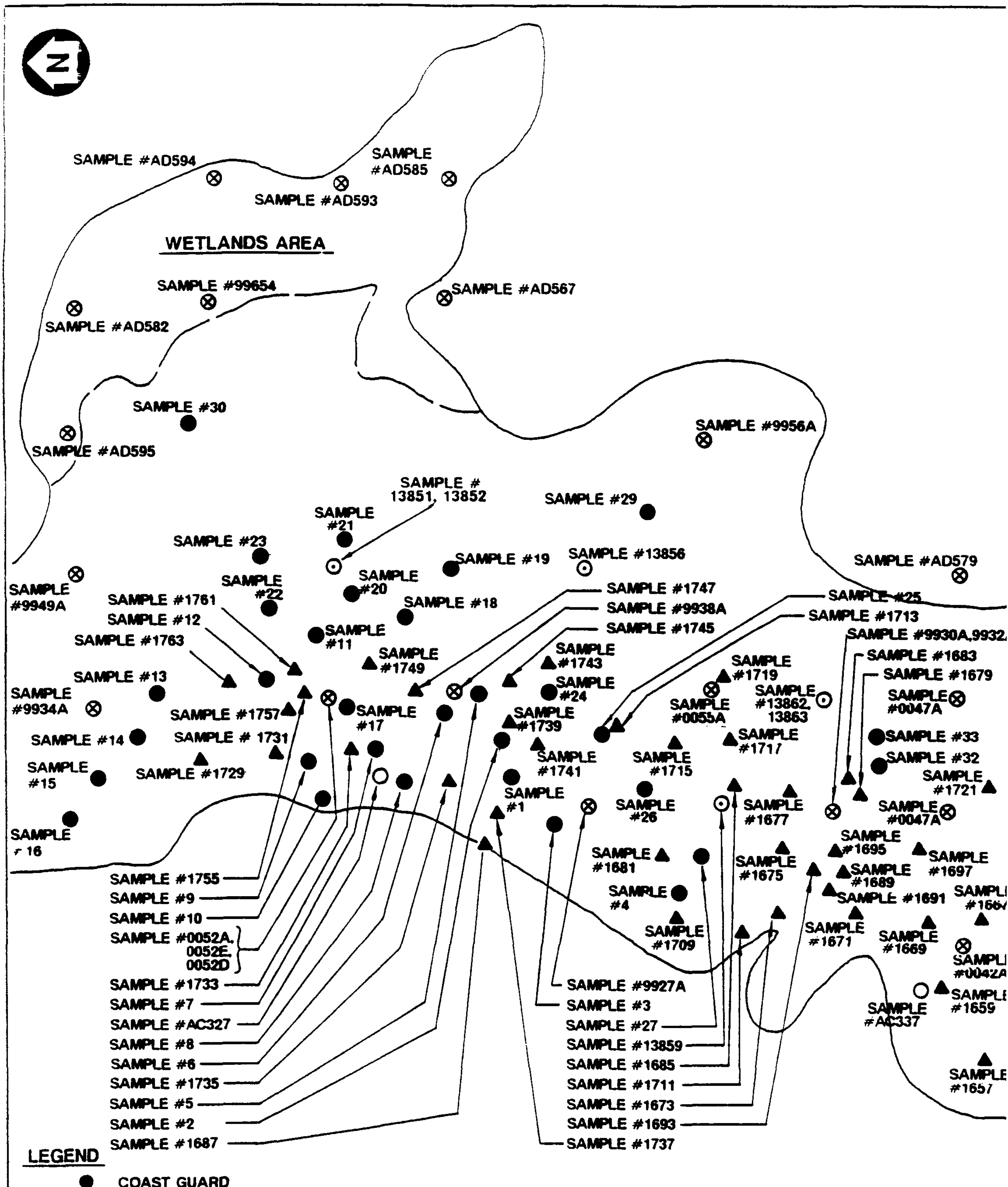
SOURCE: BATTELLE, 1990

EBASCO SERVICES INCORPORATED

ESTUARY AND LOWER HARBOR/BAY
FEASIBILITY STUDY
NEW BEDFORD HARBOR

LEAD SEDIMENT CONCENTRATION
(ppm):DEPTH 0 TO 12 INCHES

US EPA REM III PROGRAM



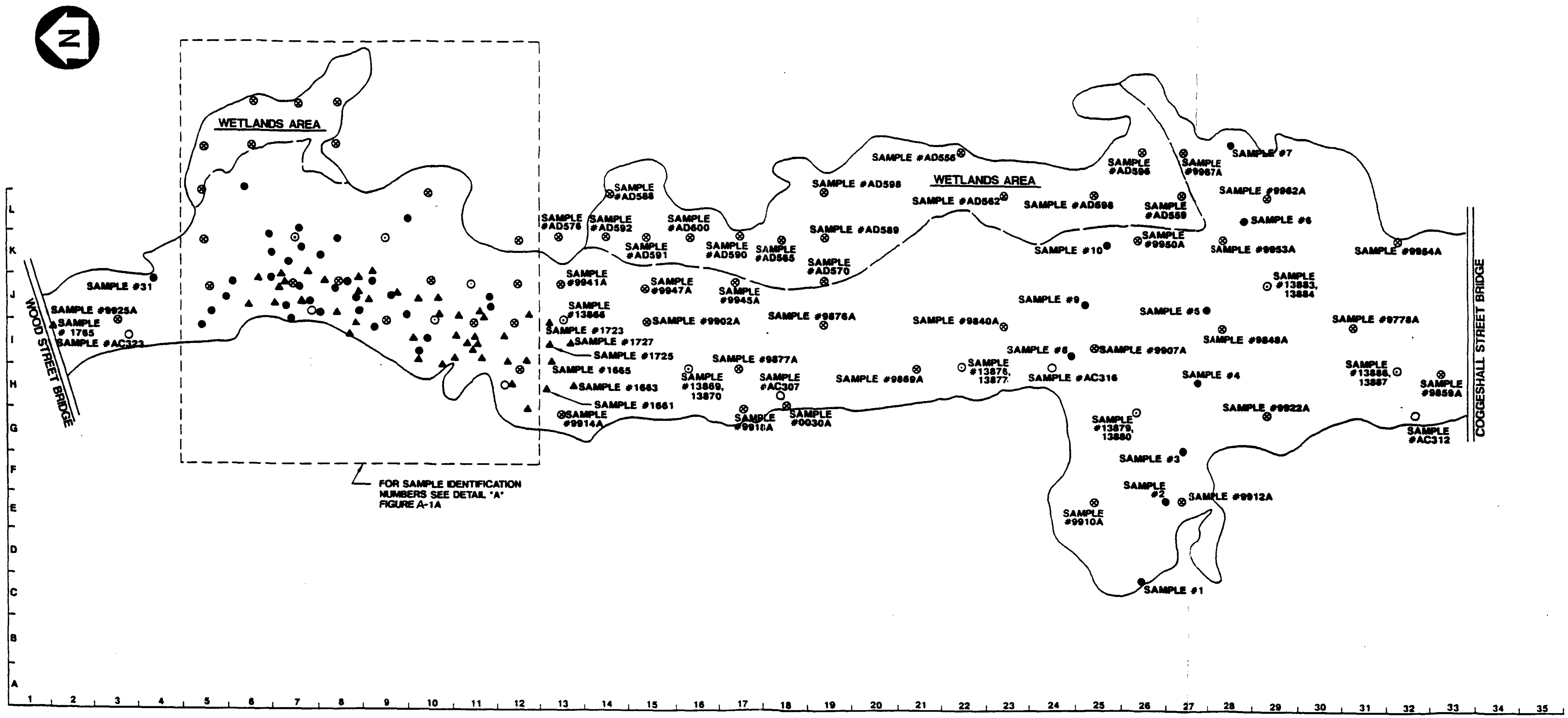
LEGEND

- ● COAST GUARD
- ○ BATTELLE HOT SPOT SAMPLING - GROUP 1
- ⊗ USACE SAMPLES - GROUP 2
- ⊙ USACE SAMPLES - GROUP 3
- ▲ USACE HOT SPOT SAMPLES

0 400 800 FEET

DETAIL "A"
PCB SEDIMENT SAMPLING LOCATIONS
DEPTH: ZERO TO 12 INCHES
HOT SPOT FEASIBILITY STUDY
NEW BEDFORD HARBOR

E.C.JORDAN CO.

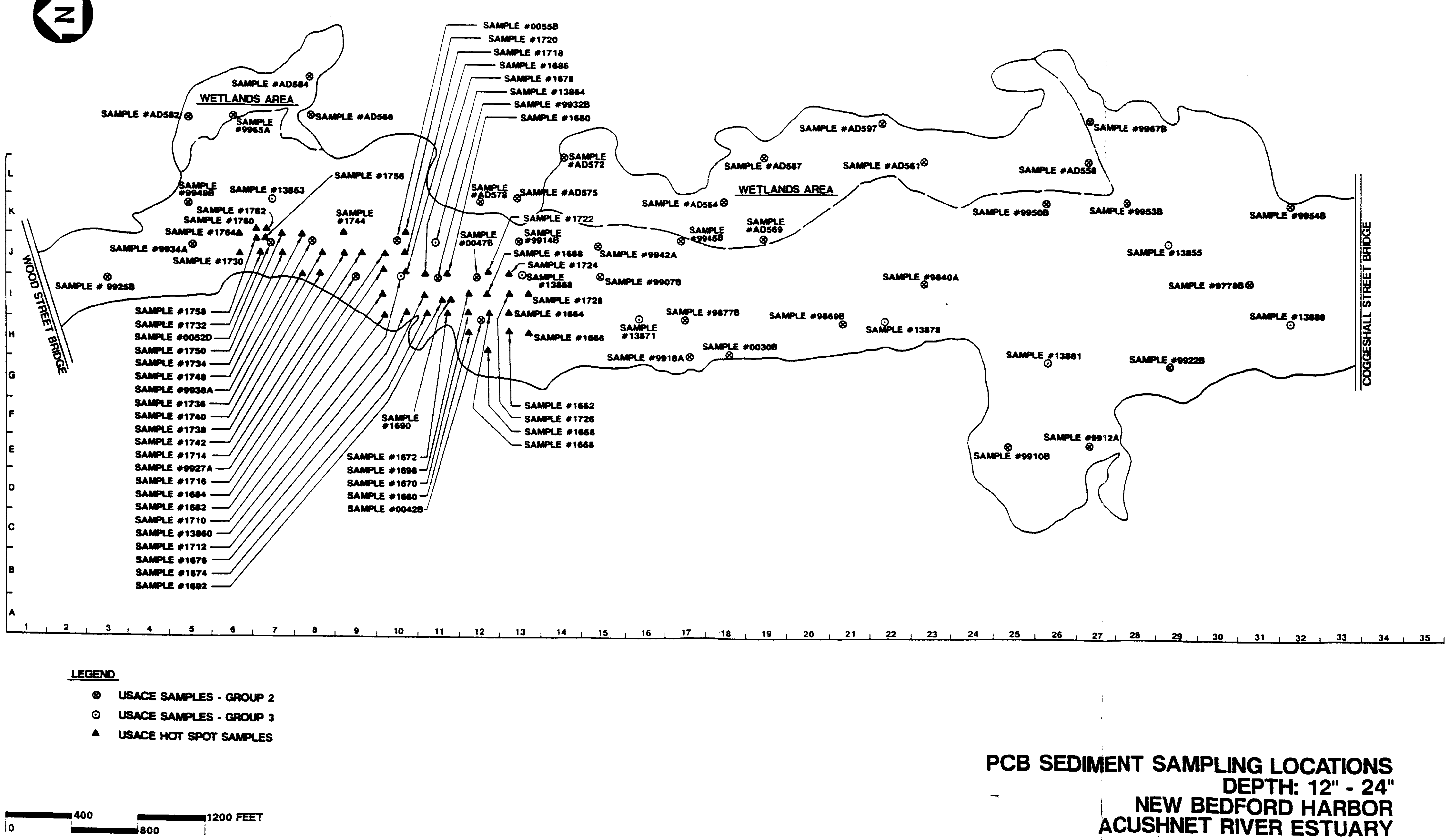


LEGEND

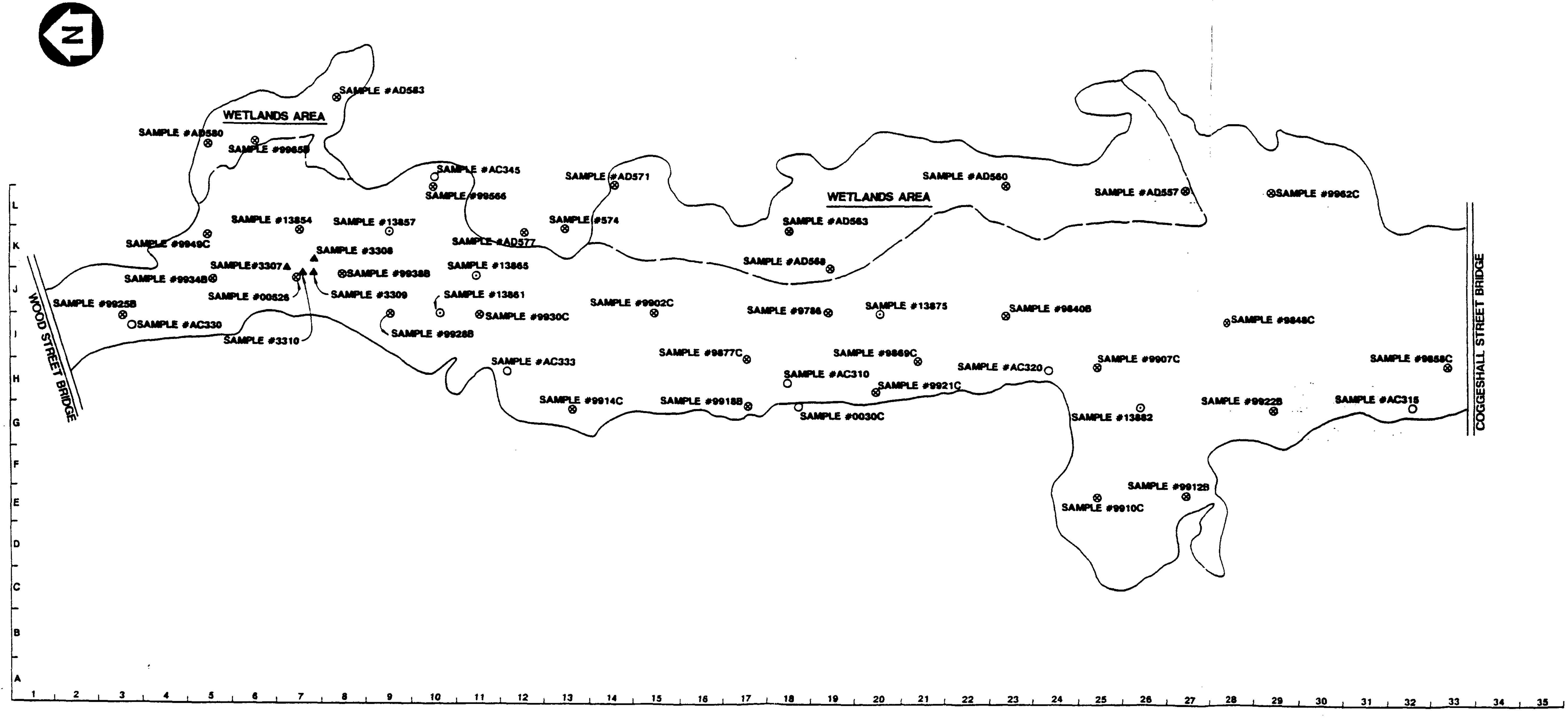
- ○ BATTELLE HOT SPOT SAMPLING - GROUP 1
- ⊗ USACE SAMPLES - GROUP 2
- ⊙ USACE SAMPLES - GROUP 3
- ▲ USACE HOT SPOT SAMPLES
- ● COAST GUARD

0 400 800 1200 FEET

PCB SEDIMENT SAMPLING LOCATIONS
DEPTH: 0 - 12"
NEW BEDFORD HARBOR
ACUSHNET RIVER ESTUARY



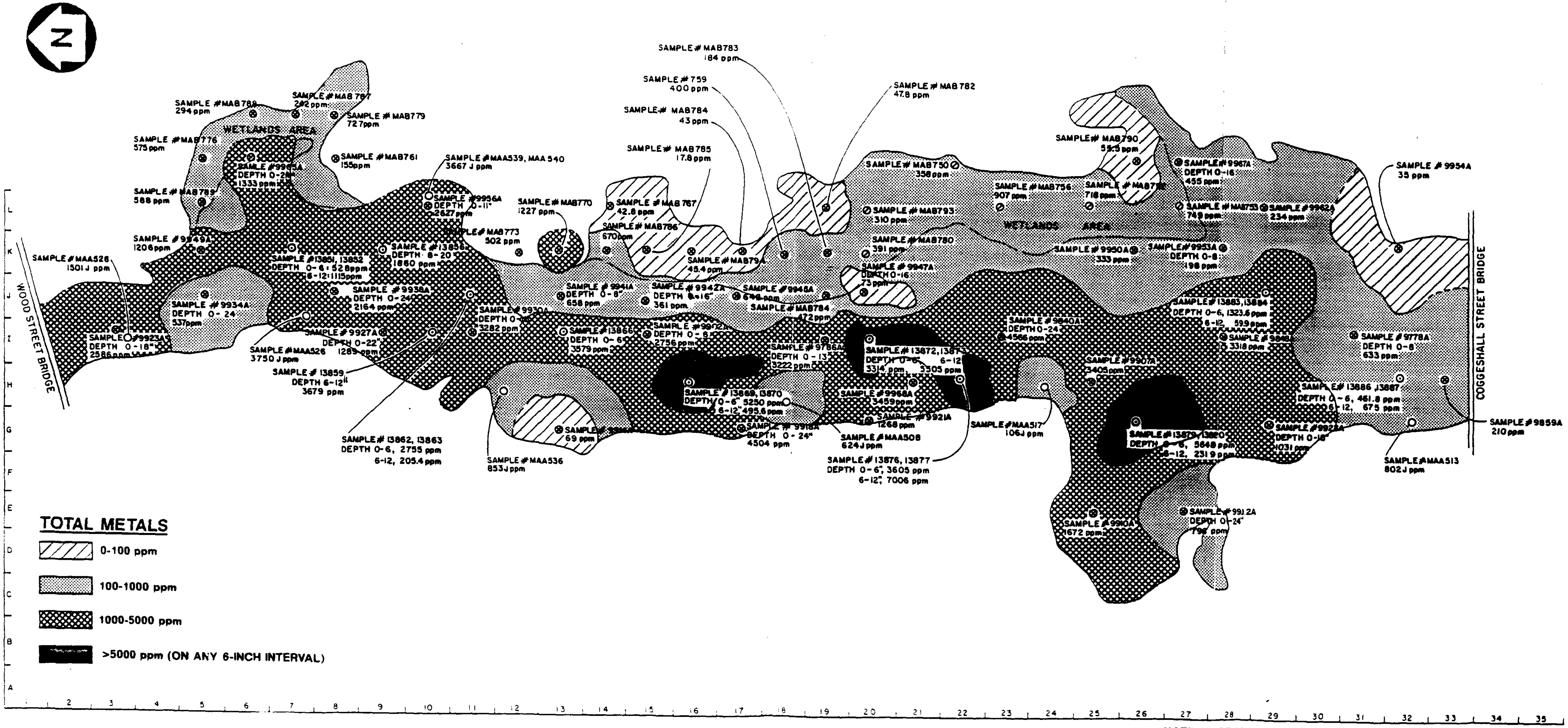
PCB SEDIMENT SAMPLING LOCATIONS
DEPTH: 12" - 24"
NEW BEDFORD HARBOR
ACUSHNET RIVER ESTUARY



LEGEND

- ○ BATTELLE HOT SPOT SAMPLING - GROUP 1
- ⊗ USACE SAMPLES - GROUP 2
- ⊙ USACE SAMPLES - GROUP 3
- ▲ USACE HOT SPOT SAMPLES

PCB SEDIMENT SAMPLING LOCATIONS
DEPTH: 24" - 36"
NEW BEDFORD HARBOR
ACUSHNET RIVER ESTUARY



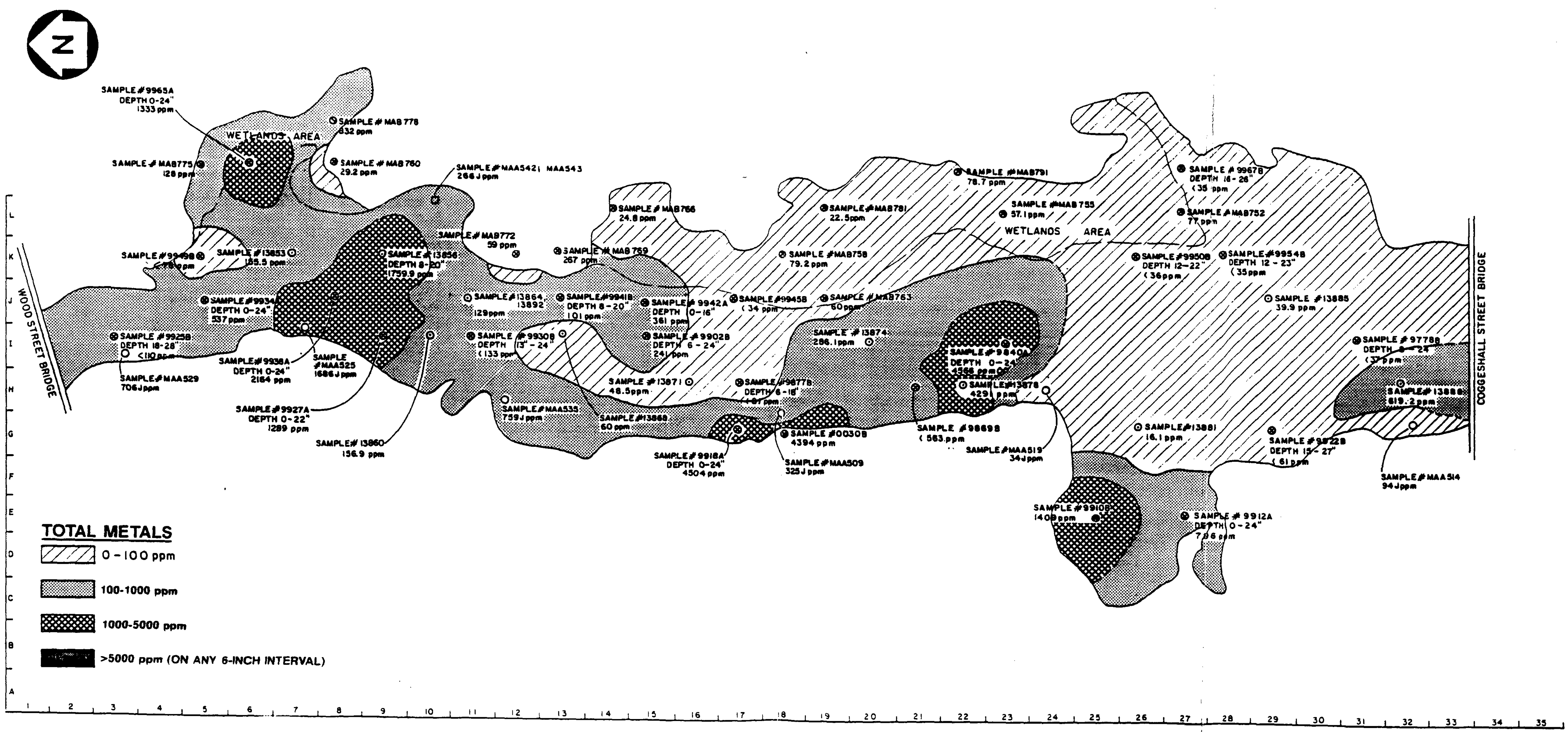
NOTE: DEPTHS ARE ZERO TO 12 INCHES UNLESS OTHERWISE NOTED

LEGEND

- ◯ BATTELLE HOT SPOT SAMPLING - GROUP 1
- ⊗ USACE SAMPLES - GROUP 2
- ⊙ USACE SAMPLES - GROUP 3

0 400 800 1200 FEET

INTERPRETATION OF TOTAL METALS CONCENTRATIONS (CADMIUM, COPPER, CHROMIUM, LEAD) DEPTH: ZERO TO 12 INCHES
ESTUARY AND LOWER HARBOR AND BAY FEASIBILITY STUDY
NEW BEDFORD HARBOR



NOTE: DEPTHS ARE 12 TO 24 INCHES UNLESS OTHERWISE NOTED

LEGEND

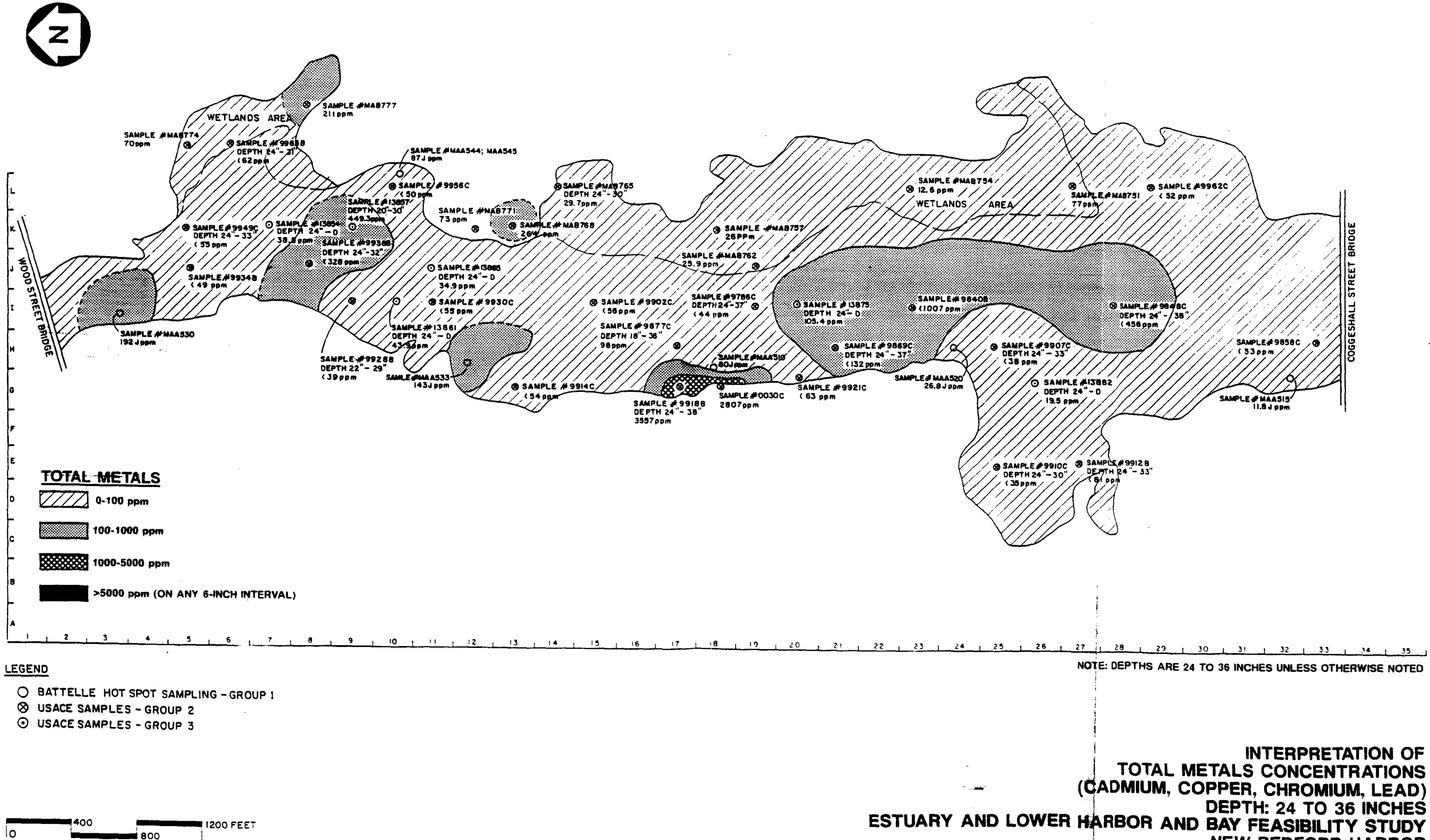
- ○ BATTELLE HOT SPOT SAMPLING - GROUP 1
- ⊗ USACE SAMPLES - GROUP 2
- ⊙ USACE SAMPLES - GROUP 3

0 400 800 1200 FEET

INTERPRETATION OF TOTAL METALS CONCENTRATIONS (CADMIUM, COPPER, CHROMIUM, LEAD) DEPTH: 12 TO 24 INCHES

ESTUARY AND LOWER HARBOR AND BAY FEASIBILITY STUDY

NEW BEDFORD HARBOR



LEGEND

- ○ BATTELLE HOT SPOT SAMPLING – GROUP 1
- ⊗ USACE SAMPLES – GROUP 2
- ⊙ USACE SAMPLES – GROUP 3

INTERPRETATION OF TOTAL METALS CONCENTRATIONS (CADMIUM, COPPER, CHROMIUM, LEAD) DEPTH: 24 TO 36 INCHES ESTUARY AND LOWER HARBOR AND BAY FEASIBILITY STUDY NEW BEDFORD HARBOR